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Editorial

Great is the temptation of the senior student to expand his chest and proffer advice to the more junior years. One of the more interesting subjects upon which his mind sometimes dwells is the importance of goals, frequently placed, to be sought after and attained in turn.

Browning omits these necessary stepping stones in *Andrea del Sarto*:

> "A man's reach should exceed his grasp,
> Or what's a heaven for?"

Six long years, each terminated by a goal attained, the medical student toils in eager anticipation of graduation only to discover that tempus really does fugit, and he finds himself still grasping for the bottom rung.

Tennyson strikes a more interesting note in *Ulysses*:

> "Yet all experience is an arch wherethrough
> Gleams that untravell'd world, whose margin fades
> For ever and for ever when I move."

But away with such philosophy lest we drop a pessimistic thought and dull the welcome of our newest friends, the members of 4T5.

Welcome to 4T5

Although the Varsity states your number decreases when the enrolment of other faculties increases, the time-worn explanation of supplanting quality for quantity must hold. We welcome

you as readers of this, your JOURNAL You will find in your early years that only a few articles in each issue will be of interest, but we hope you will keep the rest in mind and refer to them at the proper time.

Dr. Leslie Young

Welcome to Dr. Young, who has been appointed to the staff of the Department of Biochemistry, succeeding Dr. G. F. Marrian. For the past four years Dr. Young has been a member of the staff of the Department of Biochemistry, University of London, England, where he obtained the degree of Doctor of Philosophy.

Dr. G. Lyman Duff

Congratulations to Dr. Duff, who recently left our Pathology Department to accept the Strathcona Professorship of Pathology at McGill University, succeeding Dr. Horst Oertel. Dr. Duff graduated from Toronto Medical School in 1929, winning the Starr gold medal and a prize in psychiatry. After a year as demonstrator in pathology and instructor in psychiatry, he was awarded a fellowship by the National Research Council of the United States, which gave him four years in Pathology at John Hopkins Hospital. In 1935 he returned to Toronto as lecturer in Pathology, and in 1936 was promoted to assistant professor. He is succeeded by Dr. D. E. O. Magner.

The Journal

The president's message leaves little to say regarding the present European hostilities, and the part we as University students can play. As yet there has been no definite agreement as to shortening of the Medical curriculum and we hope Volume XVII of the JOURNAL will not be curtailed in any way.

The Journal this year will be printed by the University Press for the first time since 1926. In Volume XV Dr. Bill Bigelow inaugurated an Abstracts section which has been sufficiently appreciated by the undergraduate body to merit the same size of print as the body of the Journal. An additional editorial staff appointment has been made this year, that of Briefs Editor, for the purpose of extending the scope of the Journal to subjects other than medical and also to make it possible to commence all articles at the top of the page. We would appreciate your contributions to this section.

A series on The Army Medical Officer and a series of Problems in Diagnosis will be presented.

We dedicate Volume XVII to the early founders of this JOURNAL and present it for your approval.

DOCTOR HARVEY CUSHING

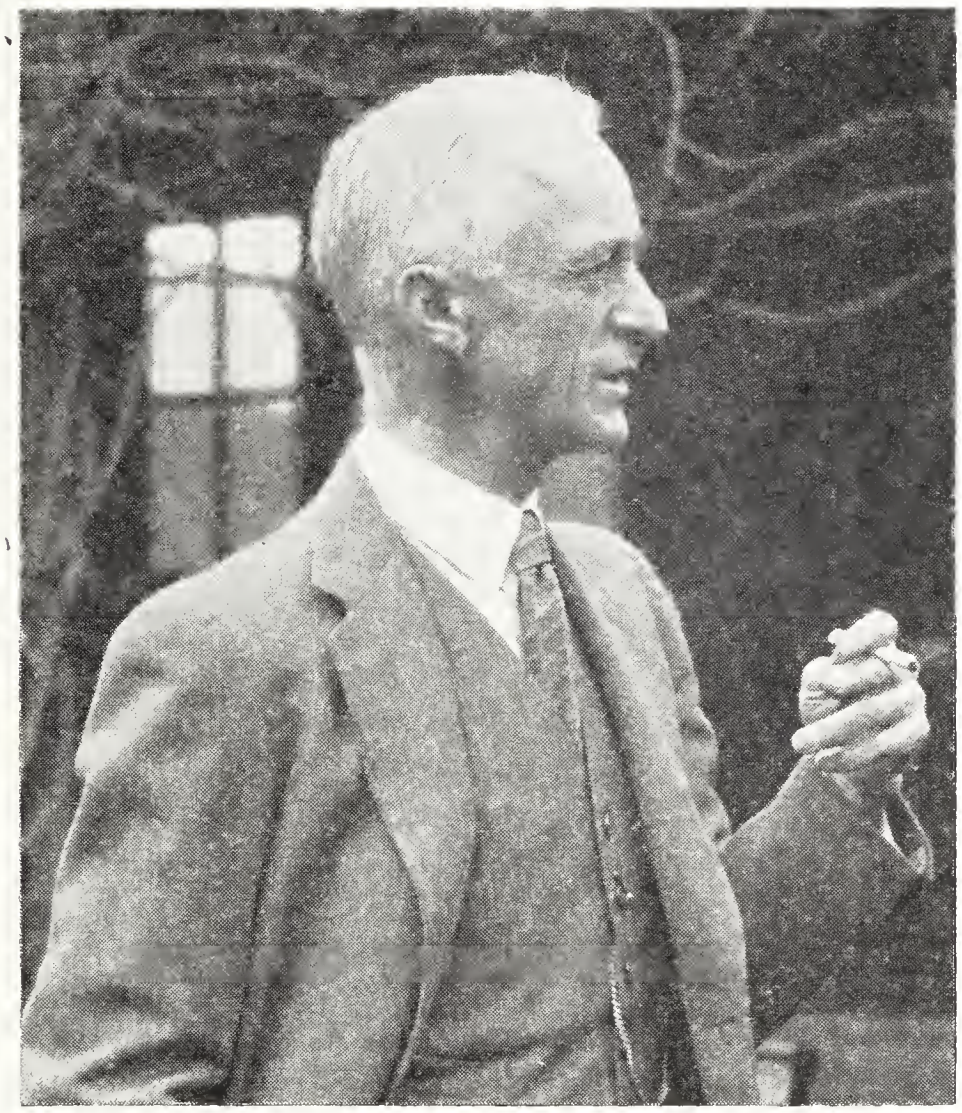
By K. G. McKENZIE, M.B., F.R.C.S.(C.)
Assistant Professor of Surgery

Dr. Harvey Cushing, the fourth in a direct line of a family of physicians, was born in Cleveland on April 8, 1869. He died on October 7, 1939, from a sudden coronary occlusion at the age of 70.

Dr. Cushing graduated from Yale in 1891 and from Harvard Medical School in 1895. After an interneship at the Massachusetts General Hospital he went to the recently opened Johns Hopkins Hospital at Baltimore. Here he became resident in surgery for three years under the great Halstead.

Those were the days when the wards of a hospital were filled with Typhoid Fever. Dr. Cushing has told me how he and the resident in medicine would take turns sitting by the bed of a typhoid patient hoping to operate within an hour after a perforation of the small intestine. A patient with a gunshot wound of the cervical spine and cord damage came under his care. Fortunately the patient gradually recovered and Dr. Cushing spent hours charting the return of sensation and motor function. Also on this patient he helped make some of the earliest x-rays used on this continent. Thus did Cushing, the hospital interne, become marked as a worker.

Knowing him as I did later, I am sure he was on the wards morning, noon and night, working on his patients and seeing that they were looked after by nurses, junior internes and orderlies. There was nothing relating to the care of one of his patients that was foreign to his interest. It would have been quite characteristic of him to interrupt and instruct an orderly giving an enema. His medical reading was stimulated by problems that his patients presented. He learned to



DR. HARVEY CUSHING

sketch, and his drawings added greatly to his records and histories making them stand out above the average. Very early in his career he must have sensed that good records were all important not only for the welfare of the patient but also as a future basis for publication, either by himself or some one else. I remember him remarking that an interne only needed to leave the hospital for a few hours once a month; he did advocate an hour a day at tennis or squash on the hospital grounds. He himself played tennis until he was well over fifty.

It has been said that Halstead recognized a brilliant pupil,—rather would I say that Halstead recognized a man who worked unusually hard and more efficiently than the average. Dr. Cushing's genius lay in the fact that with average mentality and health he set his course for the top and never became sidetracked or slackened the pace. This keeping up the pace could be sensed even in such a simple affair as playing a game of tennis. In his medical life the pace was terrific, it must have meant refusal to explore many a bypath for fear of losing the high ridge he had chosen to travel.

Dr. Cushing at the end of his interneship, which had thoroughly qualified him in general surgery was 31. He then went abroad with the intention of learning what was to be known about the surgery of the nervous system. After a few months with Horsley, the outstanding pioneer in neurosurgery, he proceeded to Berne. There, working in the laboratory under Kocher's direction, he studied the problem of intracranial pressure—a work which brought him widespread recognition. He then spent a few months with Sherrington at Liverpool. Thus equipped he returned to Baltimore and petitioned for a post as neurosurgeon in the clinic. Dr. Halstead was staggered by the proposal, he felt that there was no possible source of livelihood in neurological surgery, even Horsley did not limit himself to any such specialty. Orthopoedic surgery was suggested. However for the young Cushing it was to be neurological surgery —he had hitched his waggon to a star. If he could not start a clinical service in Johns Hopkins, he could at least work in a laboratory. This he did and with such good effect that he was able to write his book, "The Pituitary Gland and its Disorders". Neurological cases began to accumulate. Cerebral surgery at this time was in its infancy, it was still the day of mallet and chisel for entrance; of wound drainage and imperfect closure—fungous cerebri with ultimate infection was the almost inevitable consequence of most interventions for tumour. Dr. Cushing applied Halstead's use of interrupted fine silk sutures and demonstrated that suture lines in the scalp would stand up and heal, even in the face of intracranial pressure and tension on the suture line, when closure was made with a deep and superficial layer of fine silk. When this principle was established he was able to escape the previously staggering mortality rate from cerebral fungus and infection. He had reached the point when the medical profession could be told that an exposure for brain tumour was reasonably safe. The possibilities of removing brain tumours was becoming apparent. A big neuro-surgical field was being opened up.

The opportunity was there. A man of high calibre was needed. Undoubtedly the time was ripe and some man was bound to come forward. One can imagine no one better fitted than Dr. Harvey Cushing—a young man with courage, vision and great energy. Once he had set his mind on the problem nothing was to deter him. He continued to travel the road until his last monograph "The Meningiomas" was published shortly before his death.

In September, 1912, he became Professor of Surgery at Harvard and head of the Surgical Service at the Peter Bent Brigham Hospital. This was a general surgery appointment but Dr. Cushing continued to limit his personal work to neuro-surgery. In 1914, war broke out and Dr. Cushing immediately let it be known that his sympathies were with the allied cause. He organized and headed Base Hospital No. 5, from Boston. From then until his return to the Brigham in 1919, all his energies and abilities were centred on the various war neuro-surgical problems that he encountered in France. During this period

he kept a voluminous diary part of which has been published.

On his return to the Brigham Hospital, neuro-surgical patients rapidly accumulated. When I became Dr. Cushing's resident in 1922-3, the service was busy and well established with an average of 25 or 30 patients, the majority of them suffering from brain tumour. They came from all corners of the globe, many of them referred by leading medical neurologists. The time had not arrived when the general practitioner had become familiar with the diagnosis of a brain tumour, to-day the general practitioner appreciates the frequency of such a lesion and as a result we have seen the establishment of neuro-surgical clinics in all University and Medical centres.

My appointment as Dr. Cushing's resident needs telling as it gives me an opportunity of expressing my gratitude, especially of course for the opportunity of working with him for a year, but also to put on record Dr. Cushing's disposal of the prize money which goes with the Mickle Fellowship. The story is as follows:

In 1922 the Charles Mickle Fellowship of the University of Toronto was awarded to Dr. Cushing as the member of the medical profession anywhere in the world who was considered by the Medical Faculty of the University of Toronto "to have done most during the previous ten years to advance sound knowledge of a practical kind in Medical Art or Science." Dr. Cushing accepted the award of $1,000.00 that goes with the Fellowship and requested the University of Toronto to send to Harvard one of its young graduates to work with him for a year. In this way I became his resident. During that year Dr. Cushing passed the Mickle prize fund on to me, evidently realizing how helpful financial assistance often is to a young doctor.

The first contact with "The Chief" in his office in the Peter Bent Brigham Hospital in Boston still stands out clearly. It was a hurried interview, only a few minutes, but long enough for me to realize that the faster I got to work and the harder I worked the better. He had a few words of advice, above all, histories were to be kept up, examinations were to be complete. This was to be the resident's real contribution for the opportunity of working on his cases. I was to make sure that he would never look up one of my case histories in future years and find it inadequate. Later in that year (1922) I can recall showing some of my case histories with considerable pride to Dr. Fred Banting when he spent a few hours at the Hospital before giving one of his very early presentations before the Harvard Medical Students on the discovery of insulin.

The first few weeks as resident were difficult to say the least. I had never before to my knowledge seen a patient suffering from a brain tumour. There were twenty or more such patients in Dr. Cushing's wards at all times. The first problem was to master an ophthalmoscope and learn to recognize the normal and pathological optic nerve head. This took some weeks. At the same time a simple but complete neurological examination had to be applied which included the taking of eye fields on a perimeter. Examination of a patient took hours during the first few weeks, later one learned to do it in a matter of minutes. In a month or so I was finding my feet and becoming of some help in Dr. Cushing's organization.

In looking back on my year as Dr. Cushing's resident, I recall a man who must have been an extraordinary master of his time. His day's routine seemed to be set weeks ahead and seldom did anything interfere with his plans. His office was in the hospital next to his laboratories where his pathological material was worked up. At that time Dr. Bailey was working over his material for their book on "The Gliomas". There was also a room for making photographs of patients as Dr. Cushing had difficulty in recalling a patient when reading the history unless a photograph of the patient was attached to the history. His day's routine was somewhat as follows: He arrived at the hospital about ten, having already spent two hours at home working on "Osler's Biography". His study at home was filled with copies of the London *Times*, covering the period that Osler spent in

England. Each copy was read looking for some item of news having to do with Osler. Having come across some such item as: "Osler attended such and such a Medical Meeting," he would then write to men whose names were mentioned as also attending, asking for further information. In this way he built up the second volume of "Osler's Biography," a painstaking, tiring and probably a never-ending task. When Dr. Cushing arrived at his office at ten, he spent the next hour or longer at his desk dealing with routine correspondence. His desk was kept clean. Besides answering letters to doctors and patients he sent off each day a number of follow-up letters keeping his brain tumour records up to date.

At about 11.30 each day I would come down to tell him that the patient to be operated upon that day was anaesthetized and ready. He might ask his associate, Dr. Horrax to commence the operation; more frequently however, he would commence himself. There were usually visitors in the gallery. His team consisted of nurse, anaesthetist, two junior house-surgeons, one as second assistant and the other passing instruments (a training our junior internes seldom get to-day), a scrub nurse and his resident surgeon who acted as first assistant. His operations were a delight to watch, careful accurate work, without fuss. In those days cranial operations took longer than they do now. Not infrequently Dr. Cushing would put in the last suture himself and not leave the operating room until three or four o'clock. He then made himself tea and toast, had a shower and dictated an operative note, often two pages in length. Seldom did he plan a luncheon period. Then on with the next job, usually it meant seeing two or three office patients that had been worked up by his associate, Dr. Horrax. Perhaps a patient had died and relatives had to be seen and permission obtained for an autopsy. He was always available for such a duty when his resident could not control the situation. Then an hour in the Lab working on the glioma material with Dr. Bailey. About five in the afternoon his resident would succeed in getting him up to the ward to see a few special patients, especially the patient that was worked up for operation the next day. The case might be straightforward or might require a good deal of discussion and examination by Dr. Cushing. One watched him work to size up a case, ventriculograms were not common then. Often it seemed to be intuition on his part when he decided to expose the brain at a point well removed from the area where his resident had localized the lesion. He made mistakes of course, but more often than not he was right. He bemoaned the fact that he did not have more time to spend on the case. His contact with patients was a delight to watch. Just a moment with a few, but he made the most of it. Often he would tell the patient that his pillow did not look comfortable, give it a punch, ask if that did not feel better, and being told it did he would be out of the room before the surprised patient could start a long string of questions. Following these necessary brief rounds there was sometimes a half hour of tennis with the house-surgeons who he would take home to dinner. After dinner the house-surgeons shifted for themselves while Dr. Cushing worked through until eleven or twelve on the Biography. On Saturday morning there was an additional routine. He personally checked over the week's histories and wrote letters to the doctors referring the patients. There was also a weekly clinical lecture to students. A number of these were stimulating, but on the whole I am sure Dr. Cushing was disappointed in them as he simply did not have time to prepare his material. I imagine that Dr. Cushing never had much use for the didactic lecture. I think he felt that a student's job was to work on patients and to read, especially to read anything and everything that would help in looking after the patient concerned.

In sketching one of Dr. Cushing's typical days I have made it clear that there were few spare moments. Many men put in just as full a day, yet few I venture to say, make each work period count as he did. There was an underlying plan and a long view plan. The

ultimate goal was a knowledge of brain tumours, and the passing on of that knowledge to the medical profession. Each day something was accomplished toward this purpose, perhaps only a follow-up note or a beautifully worked up case history, perhaps a paper completed and published. If Dr. Cushing addressed a medical meeting his paper was always written beforehand and subsequently it was published.

Outside consultations were not accepted. Invitations to speak were only accepted when something worth while was ready for publication. Dr. Cushing more than any man I have known was master of his time. Having set himself an objective, he used each hour to reach it, and reach it he did. In his publications he has covered the field of brain tumours so thoroughly that there seems little else to be said on the subject. Furthermore he arranged for the follow-up of his two thousand verified brain tumour cases after his death. Dr. Louise Eisenhardt who had worked with him for years on his records, will ultimately complete the life work of this noble worker when all of these patients have died.

I would say that Dr. Cushing early in his career made up his mind to be a better house-surgeon than the average, to be this meant working harder than the next man. I heard him frequently tell an interne "You have to keep your eye on the ball." After establishing a record for hard intelligent work, he had the genius to grasp an opportunity in a hitherto unexplored field. The driving force never was financial gain, nor was it just a desire to be the leader in his chosen field. He was the leader because of his burning enthusiasm to hand on to the medical profession a sound knowledge of brain tumours.

Dr. John Fulton, Professor of Physiology at Yale is writing Dr. Cushing's Biography. Attempting to write such a short sketch as this gives one an inkling of the task it will be. Yet it will be a labour of love and when completed will continue the stimulus which Dr. Cushing gave to a succession of young doctors in this country and abroad who set their sails under his guidance.

Pages from the Past

ON CHILDBIRTH:

"And so, midwives had this field pretty much to themselves over countless centuries. And if there be one instance where biting criticism can be directed at women as a professional figure, this is it. Amazing and incredible though it seem, women completely failed to take any step that would aid their fellow women and themselves at this crucial event. In all the thousands of years during which agony and death were observed in a thousand ways, no women invented or contrived any method or instrument intended to lessen the pain attendant to childbirth, or to make it a safer experience. It was only when man came into the field that inventive minds sprung into action and obstetrical progress began. It may be that the very timelessness of their task inured women to their ancient methods, and that men looked more sensitively upon the scene, coming to it with fresher eyes—the eyes of an opposite sex, looking compassionately upon Nature's most fundamental, yet often cruel expression."

—The Struggle for Health,

Richard H. Hoffman, M.D.

SOME OBSERVATIONS ON GYNAECOLOGICAL DIAGNOSIS

By J. C. GOODWIN, M.A., M.D.
Junior Demonstrator in Obstetrics and Gynaecology

PART I. CARDINAL SYMPTOMS

When we consider a subject as broad in its scope as gynaecological diagnosis, it is necessary at the outset to introduce certain limitations. Accordingly the first part of this paper will be devoted to some of the underlying principles which stress the human element in diagnosis. In the second part a review of a few more recently described gynaecological conditions and a number of the newer diagnostic aids will be given.

Gynaecology in recent years has become associated with a series of more or less complex diagnostic procedures. These include various methods of roentgenological examination of pelvic structures, mechanical instrumentation designed to extend the range of vision to the internal organs lying within the pelvis, orthopedic investigation of the lower spine and pelvic girdle, as well as laboratory tests of varying intricacy. Such detailed procedures in many cases are unnecessary. The simple examination of a catheter specimen of urine, a leucocyte count, a haemoglobin estimation, the observation of a well-stained blood smear where necessary and the Wasserman test, in conjunction with a routine gynaecological investigation, will usually suffice the careful observer. The more involved laboratory or other diagnostic procedures should naturally follow rather than precede the methods of diagnosis which are within the reach of us all.

Let us proceed now to analyze the so-called *cardinal symptoms of gynaecological disease.* Although each is separately reviewed it must be remembered that most disorders of the reproductive system frequently present two or more of these in combination.

1. Pain

The patient who complains of pain requires careful study, as this single symptom is often the most misleading. "The tongue may lie but the facies never," is a very valuable aphorism. Chipman says "Pain is the greatest liar in our clinical world" because of its ability to confuse a clinical picture. In certain nervous disorders the source of pain is often referred to the genital structures, and commonly is described as severe or persistent. Disparity between the severity of pain and the existing physical findings calls for more than the all too frequent conclusion that the patient is a "neurotic." Obviously there must be a cause. The well trained physician finds it rarely necessary to label the patient a "neurotic." A patient furthermore who has been always regarded as a neurotic may fall a victim to a real pathological process. It must be remembered that even a "blank fool" can have appendicitis and other acute abdominal conditions. The term "neurotic" has been too frequently a handy refuge for the destitute diagnostician. Persons with hyper-sensitive feelings and a vivid imagination deserve the most sincere sympathy, the most painstaking thorough study, and the gentlest care. When the physical picture has been thoroughly checked and found wanting, often a little time devoted to the investigation of the patient from a psychological angle will reveal the etiological factor. Factors may exist such as domestic unhappiness, disturbed marital relations with vaginismus and dyspareunia, fear, unemployment; and many nervous and even mental upsets arise from a host of non-physical or not clearly observable causes. These commonly and effectively resist medical or surgical treatment.

Reverting to the physical side, pain, because of its origin, may be most deceiving. Witness the referred abdominal pain of pleurisy, pneumonia, angina pectoris, tabes dorsalis, etc., as

well as various reflex types of pain from maldevelopment of genital organs, endocrine and other functional disturbances. The right iliac fossa may, for example, be the site of pain originating from lesions of the spine, gall bladder, appendix, caecum, ureter and kidney, tube and ovary, and from conditions such as visceroptosis, constipation, etc. It is obvious that pain in this region requires a careful eliminative diagnosis. Backache is often ascribed to some pelvic lesion, not uncommonly by the patient herself. There is no other symptom so frequently encountered in gynaecological practice. Backache alone should not be considered diagnostic of pelvic disease. It should be related to a gynaecological lesion only when it is associated with other definite symptoms and an undisputed pelvic abnormality. In many instances the cause of backache may be completely missed if it is attributed to some simple, relatively unimportant finding such as congenital displacement, a cystic ovary or a cervical "erosion." These conditions alone never cause backache. This symptom then should once more force us to a careful eliminative diagnosis, and the latter may include a group of causes which, according to Young and Cochrane, are essentially orthopaedic, such as those due to chronic strain of pelvic joints from postural defects following childbirth, accidents, etc. The low back pain of arthritic and other spinal lesions must not be overlooked.

The character of onset of pelvic pain is important. The slow, gradually increasing pain of an inflammatory process, the acute stabbing pain of ruptured tubal pregnancy, the recurrent colicky pain indicating obstruction, as in ureteral stone, tubal abortion, ileus, etc.: the persistent full dragging pain of inadequately supported or congested organs, are all examples of pain associated with definite gynaecological lesions. Where the symptom of pain alone is given too great prominence and is associated with little or no evidence of physical change one can be sure that surgery will fail to remove it; as here surgery follows either a faulty diagnosis or none at all.

2. Bleeding

Where the patient complains of other than normal menstruation (i.e. either excessive or irregular bleeding) it practically always indicates some pathological or functional disturbance. Bleeding due solely to an endocrine cause should not be concluded until a very careful investigation and pelvic examination have been made, including the microscopic examination of uterine curettings. It is only in the past few years that suggestions of value in treatment of endocrine disorders have been forthcoming even though considerable progress has been made in diagnosis. Glandular disfunction therefore should not be concluded until all other possibilities have been excluded. There is too great a tendency in the past few years to use various glandular extracts in treatment. Too often they are employed solely on the advice of a relatively untrained detail man or following sketchy descriptions of certain glandular conditions described in the advertising pamphlets sent out by various drug companies. One has observed the same product recommended for the cure of dysmenorrhoea, amenorrhoea, irregular or profuse "menstrual" bleeding. Needless to say, the majority of these substances possess little real usefulness unless their administration has been preceded by a meticulous investigation. In any event their merit should be based on a critical evaluation of results.

From another angle it must be remembered that a patient may purposely give a misleading history of bleeding in order to obscure a diagnosis of pregnancy. In such cases curettage for diagnostic purposes or otherwise might be avoided by careful examination of breasts and pelvic organs.

The character and onset of bleeding in relation to a carefully taken menstrual history, together with the observations of the presence or absence of physical change in the genital organs, will usually lead to accuracy in diagnosis. The importance of "spotting" irregular or excessive bleeding during or after the fourth decade cannot be overrated if

one is to arrive at the early diagnosis of cancer. Examination under anaesthesia with biopsy of the cervix, or diagnostic curettage commonly may be necessary to exclude malignancy as no other definite signs or symptoms may be associated with the abnormal bleeding.

3. Discharge

This includes such types of vaginal discharge as mucous, serous, purulent, sanguinous or blood-tinged. They may occur alone or in combination. They may possess the added characteristic of odour, foul or otherwise. The most frequent type of vaginal discharge is of a mucoid nature and is termed *leucorrhoea*. This is a symptom and not a disease. It may exist from constitutional or endocrine causes and is commonly seen in adolescent girls. Low thyroid function, secondary anaemia, malnutrition and overwork, etc., may be present. It may also be found symptomatically in uterine displacements, subinvolution, etc., due to pelvic congestion and overactivity of cervical glands. Serous discharge is less frequent and may result from non-infective chemical ulceration, post-operatively from wound surfaces, or in early cancer. With the latter it is usually associated with "spotting" and often a foul odour. Purulent discharge, of course, indicates infection. The most common cause of this is gonorrhoea. The latter diagnosis *always* should be confirmed bacteriologically as there are many non-specific causes of purulent urethral or vaginal discharge. The microscopic examination of stained smears of any purulent discharge, or better still the report of bacteriological culture, will aid in diagnosis by indicating the underlying cause of the infective process. Recently a much-discussed cause of a frothy, greenish-yellow, purulent irritating vaginal discharge is the Trichomonas vaginalis, a unicellular flagellate organism. This condition will be described in more detail later. It is found in association with a persistent subacute vaginitis associated with much vulvar irritation, and responds to none of the usual methods of treatment. One commonly sees also a low-grade non-specific infection occurring about the time of or after the menopause. It is associated with atrophic change in the genital structures, chronic vaginal hyperaemia, a muco-purulent discharge and with nervous and vasomotor symptoms. This is seen occasionally as well in somewhat younger women, though frequently celibate and sterile, and who present a gradual diminution in menstrual flow. Pruritis vulvae may occur here as well. It is difficult to explain, but may in some way be related to diminishing functional activity of the reproductive system, with the consequent lowering in tissue resistance to infection. Sanguinous discharge is most often related to some or other aspect of pregnancy or to malignancy. In the latter instance it is usually associated with a muco- or seropurulent foul-smelling discharge. This of necessity calls for full investigation.

4. Urinary Symptoms

It is not surprising that genital lesions are often accompanied by urinary symptoms when we consider the arterial, venous, lymphatic and nervous relationships of the genital and urinary organs. Urinary symptoms are commonly observed in conjunction with such sequelae of childbirth as cystocele, urethrocele, uterine displacement, fistulae, etc. Urinary frequency, painful micturition, urinary incontinence and difficulty in voiding are seen in these cases. Pelvic impaction of retroverted gravid uteri, cervical fibroids, ovarian cysts, etc., more often cause urinary symptoms than rectal, though neither is a common finding. Inability to urinate is commonly observed following childbirth and pelvic or abdominal operations. It may be due to nervous or psychic causes, or to actual damage to bladder wall and nerve supply. Permanent injury is rare; and return to normal function usually occurs anywhere from a few hours to a few days. Faulty technique in catheterization, or more commonly the occurrence of overdistension of the bladder may result in cystitis. In genital infection, burning on urination is a common symptom as a result of acute urethritis. The presence of any infective vaginal

discharge may produce urethral inflammation. Diseases of kidney, ureter and bladder are confused frequently with genital lesions, and vice versa, so that in cases where the diagnosis is not definite, resort should be made to urological investigation. Dyspareunia and vaginismus are not uncommonly due to lesions of the urethra, bladder and lower portion of the ureters. The invasion of bladder or urethra, by malignant or infective ulceration, may result in fistulae though, fortunately, less of this is seen at present than in past years.

5. Swelling

Visible swelling of the reproductive structures may be evident from inspection of the external genitalia; or as denoted by abdominal, or more particularly lower abdominal enlargement. It is perhaps unnecessary to point out that the most common swelling of the abdomen of a woman in the childbearing period is a pregnant uterus. In most instances, leaving out abdominal enlargement due to pregnancy, the cause of abdominal swelling is either new growth or infection. Careful abdominal and bimanual examination usually serve to indicate the pelvic attachment or origin of the lower abdominal swelling. Neoplasms are evident as a rule by the absence of inflammatory symptoms though infection may be superimposed in some cases. Inflammatory swellings usually proceed with greater rapidity than those due to new growths, including cysts. A knowledge of the menstrual history especially, is of value in the diagnosis of pregnancy—whether uterine or extra-uterine. One must always bear in mind extra-genital causes of abdominal swelling such as full bladder or bowel, extreme adiposity of the abdominal wall, ascites, pelvic kidney, ileus, other bowel diseases, etc. External genital masses or swellings, due to new growth, inflammation, varicosities, prolapse, cystocoele, rectocoele, herniae, etc., are as a rule readily interpreted in a good light and with adequate exposure. They should be subjected to the tests of coughing, straining, standing and other postural variation. Rectal lesions producing external or intravaginal swelling may become confused with lower genital tract disorders especially when of inflammatory or malignant causation. Here again a careful history and functional inquiry, vaginal and rectal examination, combined if necessary with a proctoscope or sigmoidoscopic examination will usually serve to indicate the diagnosis.

Pages from the Past

FAITH:

"Yet, after all, the psychical method has always played an important though largely unrecognized part in therapeutics. It is from faith which buoys up the spirit, sets the blood flowing more freely, and the nerves playing their parts without disturbance, that a large part of all cures arises. Despondency, or lack of faith, will often sink the stoutest constitution almost to death's door; faith will enable a bread pill or a spoonful of clear water to do almost miracles of healing when the best medicines have been given over in despair. The basis of the entire profession of medicine is faith in the doctor and his drugs and his methods."

Sir William Osler.

THE PHYSICIAN:

"The public needs to get a fresh conception of the physician's function. His position, in the fight with disease, is, perhaps comparable with that of a commander-in-chief, whose job is not the divine one of determining victory, but of studying the forces arrayed against him, and of organizing the forces at his disposal to the best advantages. Or, again, it may be compared with that of a captain caught in a storm at sea, whose duty is not, as some superstitious and hysterical passenger may demand, to calm the storm, but by clever seamanship, to bring the vessel safely through it."

Medical Modes and Morals,

Harry Roberts, M.D.

A PROBLEM IN DIAGNOSIS

SUMMARY OF CLINICAL FINDINGS

By W. A. OILLE, M.D.

Patient J. H. Thirty-three year Scotchman, resident of Ontario eleven years, working as a fish handler. Admitted to Ward H Sept. 13, died Sept. 15, 1939.

Patient was perfectly well until Sept. 6 when he suffered a mild chill, two days later developing a sore throat, frontal headache, malaise and a second chill. For the ensuing four days until admission these symptoms persisted in association with anorexia, nausea and vomiting. On Sept. 9 he noted his urine becoming very dark. The following day the stools were pale. Sept. 11 sclerae and skin became yellowish.

Examination

On admission Temp. 97°, pulse 80, resp. 25. A young jaundiced adult male appearing acutely ill, though suffering from no local distress.

Tongue dry, covered with a brownish coating; pharynx red and congested.

Chest revealed numerous scattered rhonchi.

Liver enlarged, palpable one inch below costal margin in right mid clavicular line, smooth, firm, not tender. Spleen not palpable.

Skin deeply yellowish brown colour; no purpura.

Laboratory

Urine. Alb. ++; Bile +++; Urobilin +; Blood ++; R.B.C. and W.B.C. numerous; few hyaline casts. Hb. 74%; R.B.C. 4.1; smear-normal appearance. W.B.C. 9.1; 82% polymorphonuclears, 17% lymphocytes. N.P.N. 166 mgm %. V.D.B. positive direct and indirect 48 units. Blood, urine and stool cultures and guinea pig inoculations negative.

Course

During the two days in hospital, temp. rose to 100°, patient became drowsier, jaundice deepened. Developed oliguria then anuria, N.P.N. rising to 213 mgm %. Rhonchi persisted.

Summary

A healthy young man working in the fish market, suddenly develops an acute illness, the onset characterized by rigors, and bronchitis with constitutional symptoms of malaise, anorexia, nausea and vomiting, becomes jaundiced then develops evidence of extreme renal damage. The course was rapid with increasing jaundice and anuria terminating fatally nine days from the onset.

SUMMARY OF AUTOPSY FINDINGS

By E. B. TOVEE, M.D.

A complete autopsy was performed 3 hours after death. The body was that of a well developed and well nourished 33 year old male. The skin was deeply jaundiced and a few recent red petechiae were present in the skin over the sternum. Small discrete lymph nodes were palpable in the cervical, axillary and inguinal regions. All the organs showed various degrees of bile-staining.

The *liver* was moderately enlarged weighing 1815 grams. The capsule was thin, smooth, glistening and of a pale reddish-brown colour. The cut surfaces were flat and a pale cloudy appearance was sufficiently marked to partially obscure the normal lobular architecture.

The *kidneys* were enlarged, swollen and soft. The left kidney weighed 240 grams and the right 200 grams. The capsule stripped with ease disclosing a bulging, dark-red external surface. On section the cut edges rolled outward, indicating a degree of parenchymal

swelling which was also evidenced by increased thickness of the cortex. Both cortex and medulla were of a dull dark-red cloudy appearance. There was a small bright red patch of submucosal haemorrhage in one calyx of the right kidney. The *pelves* and *ureters* showed no lesions.

The *pericardium* showed evidence of a marked serofibrinous pericarditis. The sac contained a moderate amount of thick turbid fluid rich in fibrin. In some areas, patches of fibrinous exudate were adherent to the surface of the right auricle. Beneath the pericardium at this point a few recent, red patchy haemorrhages were noticeable. The *heart* weighed 325 grams. The myocardium was firm and grossly normal. The coronary arteries were likewise normal and the chambers, appendages, endothelium and valve cusps showed no lesions.

The *spleen* was dark red, soft and mushy, and the splenic pulp could easily be scraped away. The lymph nodes of the mesentery and the cervical, axillary and inguinal regions were enlarged, discrete and rubbery in consistency.

The *brain* weighed 1790 grams and showed a moderate amount of oedema.

The *thyroid*, *pancreas*, *gall bladder*, *intestines*, *bladder*, *adrenals*, *prostate* and *testes* were normal.

Microscopic Examination

Several sections of the *liver* were examined. The most striking feature was a complete disorganization and disintegration of liver cords with disappearance of the normal lobular architecture. The liver cells were no longer arranged in cords, the parenchyma being made up of a jumble of liver cells in various stages of degeneration. The better preserved liver cells were large with a purplish somewhat granular cytoplasm and a large nucleus. In some cases, cells containing two nuclei suggested that mitotic division had occurred. In other cells disappearance or pyknosis of the nucleus and pale wispy, thready cytoplasm indicated complete necrosis. Most of the portal areas were distinguishable and some of them showed round-cell infiltration.

Sections of *kidney* showed an absence of glomerular changes, but extensive degeneration in the convoluted tubules. In most of these tubules the epithelial cells were pale, swollen and granular and in many no nucleus was visible. A few small collections of round cells were seen in the interstitial tissue of the medulla.

Sections of the *heart* revealed an interstitial myocarditis. Many small mononuclear cells and lymphocytes were seen diffusely infiltrating between muscle bundles and individual muscle fibres. Some loss of cross striation and swelling of fibres was in evidence.

Sections of *spleen* showed an increased number of mononuclear cells throughout the pulp. The Malpighian corpuscles were composed of loosely packed cells which merged indistinguishably into the surrounding tissue. These findings suggested an early acute splenitis.

Sections of the *lymph glands* showed distension of sinusoids, disintegration and disappearance of germinal follicles and an increase in the number of mononuclear cells. The appearance was that of an acute catarrhal lymphadenitis.

Sections of other organs were essentially negative.

Sections of the liver, kidney and adrenals were then stained by the Levaditi silver impregnation method for spirochaetes. The typical small spiral hook-ended spirochaete was demonstrated in small numbers in the cells of the convoluted tubules of the kidney but in no other organs.

Bacteriological Examination

In an effort to domonstrate the presence of the leptospira, suspensions of liver, kidneys, blood and urine were injected intraperitoneally into white guinea pigs. One of the pigs injected with the suspension of the right kidney died 9 days after injection without apparent jaundice. Sections of organs from these animals stained by the Levaditi method and dark field examination of the emulsions of these organs failed to show the spirochaete. None of the other animals injected with the original autopsy material showed any evidence of jaundice during an observa-

tion period of one month. Thus, no laboratory evidence was obtained of the presence of the leptospira icterohaemorrhagiae in the material from this case. However, a study of other reports revealed that negative guinea pig tests have occurred in cases definitely proven to be Weil's disease by other methods. Workers believe this may be due to a particular resistance of certain strains of guinea pigs to the organism.

Discussion

Attempts during life to demonstrate the leptospira icterhaemorrhagica from blood and urine by culture and guinea pig inoculation were not successful.

In view of exposure to spirochaetal infection, the rapid progress of the illness with the development of extremely intense jaundice associated with marked renal damage, a clinical diagnosis of Spirochaetosis Icterohaemorrhagica or Weil's Disease was made.

The autopsy findings in this case, that is, the necrosis and disintegration of liver structure, the nephrotic changes in the kidneys, the acute splenitis and generalized lymphadenitis are typical findings in Weil's disease. The changes found in these various organs are thought to be due not only to the direct action of the spirochaete on the tissue but also to the action of its toxins. The most interesting finding and the one which makes the case worthy of report from the pathological view-point, is the interstitial myocarditis and the associated pericarditis. Although this is a very unusual finding there is no reason to think that this is not an integral part of the pathological picture of this case.

IT'S FUNNY WHAT ODD THINGS ARE DONE IN REPORTS

Woman and house neat but bare.
Man has ulster on his stomach.
Woman is saving up for an illness.
Couple breaking up home, friends helping.
Milk needed for the baby and father is unable to supply it.
Until a year ago this applicant delivered ice and was a man of affairs.
Couple have been completely stripped. Now barely able to get along.
These people are extremely cultured. Something should be done about their condition.
Since Christmas family has been living on a Democratic Club basket.
Man has diabetes and is insulated twice daily.
Couple's only source of income is four boarders all out of work. They owe $600.
Man aggressive—has nine children.
Applicant's wife is making little garments through the kindness of a neighbour.
Nice, quiet home family. Dorothy has been out since July.
Applicant and wife are illegally separated.
Roomer pays no board as he usually acts as god father.
The people have religious pictures all over the place, but seemed clean, however.
Man recently had operation but is able to hold any position he assumes.
Sophie is married to a sailor and her whereabouts are unknown.
Apartment crowded and untidy. Saw evidence of girl in clothing.
Woman says they are a delicate family and must have steamed apartment with eggs and oranges.
Applicant has one child, Lillian, who is three months old and owes 12 months rent.
Saw woman. She has seven children. Husband a veteran.
Applicant is typical real American. He is the father of eight children.
Woman still owes $45 for a funeral she had recently.
Woman in quarry, too old to work, too young for pension.
Man hit by automobile—speaks broken English.
This woman is ill, is being treated. The gas has been turned off.
The daughter, Mary, is active mentally and otherwise. She has advanced herself but not at home.

Answers from reports of social service investigators.

From James Mather, M.D., D.P.H.,
Branch County Health Dept., Coldwater, Mich.
From Health Dept. Records, taken from records of social workers in Florida and appeared in a local paper ("Jonesville Independent").

THE ARMY MEDICAL OFFICER

ORGANIZATION OF MEDICAL SERVICES

By L. F. KOYL, '40

The medical services of a modern army are organized to carry out two tasks:

(1) To maintain the health of the troops and to treat disease as it occurs.
(2) To handle the casualties of battle.

Their first task is the same as that of the civilian doctor, and the M.O.H. of a municipality. There are, however, certain essential differences.

In an average urban municipality the doctor's potential patients are supplied with clean, pure or purified water. There is an adequate sewage disposal system. Food comes from clean stores or refrigerated abattoirs. People live in warm, fly-proof houses, and are not exposed to the weather twenty-four hours a day.

On active service the troops' water supplies may be fouled. Sanitary arrangements are primitive. Food is carried over long distances in open trucks, or stored in dumps. Perishables may arrive in doubtful condition. The medical officer's potential patients may live under canvas or in damp trenches for weeks at a time, crowded together.

The Regimental Medical Officer, therefore, has not only to carry out those procedures which he has normally to do in peace time, but, in addition, must see that those procedures which are normally in peace time done for him are attended to—his public health programme must start from scratch. He has, however, several advantages. He is dealing with a selected group of young men of a given age group and of a known degree of physical fitness. He does not have to contend with the degenerative diseases of older groups. His patients must obey the health rules which are laid down for them. They must be vaccinated, they must be immunized to diphtheria. If the M.O. tells the patient to report to him on Tuesday at 2 p.m., the patient will be there—at 2 p.m. These refinements, as civilian doctors will realize, are a great help.

To handle patients who become ill, the Regimental M.O. may have one of several places to which he may send them, as follows: to a Camp Hospital, to a Hospital for Communicable Diseases, to a Divisional Rest Camp; or if they are ambulant cases he may retain them in the unit but relieve them of duties.

The second task of the medical services in the field is to handle the casualties of battle. This task may be divided into three parts:

(1) Collection of wounded.
(2) Evacuation of wounded.
(3) Treatment of wounded.

These parts are, of course, inseparable from one another, but in general they are carried out by different portions of the medical services.

The Regimental M.O. with his N.C.O.'s and stretcher-bearers are responsible for the collection of casualties from the field of battle and the emergency treatment of wounds. This group sets up a Regimental Aid Post to which the stretcher-bearers bring the casualties. This Post, if possible, should be protected from rifle and gun fire. The evacuation of casualties behind the R.A.P. is carried out by other medical units. The first of these is the Field Ambulance, of which there are three to a division. This unit is composed of a headquarters and two companies. Each company can form an advanced dressing station. Headquarters can form a main dressing station.

The personnel of the company of the Field Ambulance are responsible for the evacuation of casualties from R.A.P. to A.D.S. To do this they may use their stretcher-bearers, or if the country is

favourable, a combination of stretcher-carry and ambulances of H.Q. Field Ambulance. At A.D.S. dressings are re-adjusted, stimulants and hot drinks are supplied. Some emergency surgical treatment may, if necessary, be given. The Field Ambulance company is mobile. They can move themselves without additional transport.

The personnel of H.Q. Field Ambulance are responsible for evacuation of casualties from A.D.S. to M.D.S. by motor ambulance. This is again just a way-station on the road back, but some life-saving surgical procedures may be carried out. A.T.S. is given, full particulars of the case taken, and creature comforts supplied.

The next unit is the Casualty Clearing Station, which is a fifty-bed hospital, not in itself mobile. It is therefore usually a considerable distance back, so that it will not be affected by sudden changes in the situation up ahead. Its primary purpose is again evacuation, but many major surgical procedures may be carried out if necessary. It attempts to keep itself ready to meet sudden demands upon its capabilities, and so retains only those wounded who are seriously ill. Wounded are evacuated from M.D.S. by ambulances of the Motor Ambulance Convoy, an Army Service Corps unit with medical personnel attached. This type of unit may also evacuate casualties from C.C.S. to a railway station called "railhead" from which they are taken to General Hospitals by ambulance trains or by inland water transportation, or by more motor ambulance convoys.

A military General Hospital may be as large and as fully equipped as a modern 1200-bed hospital. Here much of the surgery and all of the specialist work is done. When the patient is recovering he may be sent to a convalescent depot, where he receives graduated exercises, rest, fresh air, and so on.

Now if we go back near the Front again, there were, you remember, three Field Ambulances per division. If one of these is not busy, as is often the case, it may form one of several posts:

(1) A Walking Wounded Collecting Post, from which ambulant cases are collected by M.A.C.'s and taken to C.C.S.
(2) A Divisional Rest Station for patients convalescing from minor injuries.
(3) Special Gas Treatment Centres.

We have not discussed the many activities of those members of the Medical Corps who are responsible for the organization and administration of the Corps, or those who are detailed to special duties—to research, to pathology laboratories or mobile bacteriology laboratories, to field hygiene sections, and many other activities. They are vitally important to the medical services, but not so apparent to the troops for whom the Corps is formed.

INFECTIOUS MONONUCLEOSIS

By A. L. HUDSON, '40

Infectious mononucleosis has been described under a variety of names among which are glandular fever (Pfeiffer) and monocytic angina. In 1920 Sprout and Evans applied the term infectious mononucleosis to this disease.

Etiology

Some writers have expressed doubt as to the infectiousness of this condition; Tidy, however, believes that it is an epidemic disease with an incubation period of 5 to 15 days and that transmission occurs through direct contact in the early stages and through droplet infection in the later stages. The evidence that Listerella monocytogenes (Murray) or Bacterium monocytogenes (Nyfield) are the causative agents lacks confirmation; it may be that it is a virus disease. The condition is in some respects very similar to acute leukemia but the lymphocytic cells in infectious mononucleosis remain in the blood stream and lymphatics instead of infiltrating other organs as in the former condition. The older writers, in fact, considered the only means of differentiating the two was by the inevitably fatal outcome of acute leukemia.

Symptoms and Signs

Clinically infectious mononucleosis may mimic a variety of conditions. Marshall has reported four cases each of which presented a diagnostic problem; the first case had a predominance of cerebral symptoms (ptosis, neck rigidity, photophobia and horizontal nystagmus), the second resembled acute lymphatic leukemia; a third case was merely one of follicular tonsilitis, while a fourth had as the chief complaint just a feeling of weakness. These cases were all proven to be infectious mononucleosis by the Paul-Bunnell test. Among the cases at St. Michael's hospital several show entirely different clinical manifestations. One resembled tuberculous lymphadenitis; another had sore, painful and enlarged joints and subsequently developed a mitral systolic murmur, suggestive of acute rheumatic fever; a third case had only a severe acute nasopharyngitis and laryngitis; a fourth developed an erythematous body rash and generally resembled scarlet fever. One interesting case had as its predominating symptom, parietal headache with tenderness and hyperaesthesia over the left cheek and ear. Still another case had mainly gastro-intestinal symptoms —nausea, vomiting and diarrhoea—and developed several rose spots on the skin over the abdomen. But heterogeneous as the clinical picture may be, there are some symptoms and signs common to all cases.

The course of the disease is from ten days to several weeks. The patient first complains of weariness accompanied by anorexia or post-prandial nausea. In three or four days he develops severe frontal or parietal headache, sore throat and general ill-health. Although the sore throat is not very distressing there is often puffiness and edema of the subcutaneous tissues of the neck, making swallowing difficult. At this time the patient usually has night sweats and his temperature and pulse are both slightly elevated. The complaint which finally brings the patient to his physician is enlarged and painful glands. These begin in the posterior triangle of the neck and gradually all of the cervical nodes become involved; these alone may be affected or submaxillary, axillary or often inguinal lymphadenopathy may occur. Occasionally the epitrochlear and small glands at the nape of the neck may become sore and palpable. The greatest degree of enlargement occurs by about two weeks after the onset of symptoms and the enlarged glands are always discrete from the surrounding tissues. In about fifty per cent. of cases the spleen is tender and palpable. The physician finds a completely prostrated, feverish and dehydrated patient in a well advanced case. The temperature is 102 or

103 degrees Fahrenheit but is seldom higher and there may, in fact, be no fever at all. The pulse is full, regular and increased in rate. The throat is intensely inflamed and the tonsils may be covered with a sero-purulent exudate. Occasionally the patient develops a pinkish brown maculo-papular eruption scanty of distribution which fades in a few days.

The temperature and pulse remain elevated for several days or even weeks, then gradually regain the normal. The lymph glands return to their normal size four or five weeks after clinical recovery. The blood picture, too, is usually normal within a month of recovery. The serious terminations of infectious mononucleosis are suppurating adenitis, which appears rare; septicemia and haemorrhagic nephritis. Acute otitis media and retropharyngeal abscess have been reported as has aseptic meningitis with increased globulin and lymphocytes in the cerebrospinal fluid.

Laboratory Procedures

Similar to so many other conditions, the blood reflects the nature of the disease and a diagnosis can usually be made by blood counts and examination of stained blood films. The leukocytes are increased but counts above 30,000 per cmm. are seldom seen, the usual count being about 15,000 to 20,000 per cmm. The polymorphonuclear leukocytes are increased in the first few days of the disease and along with this there is a characteristic lymphocytosis. The differential count is shifted in favour of the lymphocytes as the disease progresses with a corresponding reduction in the polymorphonuclears, so that lymphocytic cells form about 90 per cent. of the total leukocytes; of these the majority (70 per cent.) are abnormal lymphocytes. The typical cells seen in this condition are not immature but large, abnormal lymphocytes sometimes called "mononucleosis cells". The size varies from that of an intermediate lymphocyte to that of a monocyte; this variation may or may not be observed in a single blood film. The nuclei are irregular, ovoid and pale staining; sometimes kidney-shaped and lobulated forms are seen. The cytoplasm is usually abundant and pale staining with Leischman's stain and may contain deep red "azeurophilic" granules. Some of the cells may bear a striking resemblance to plasma cells and only rarely is there any immaturity of the nucleus. In the height of the disease there are many young neutrophiles present and a mild monocytosis is sometimes noted. A moderate eosinophilia has been reported during the decline. The leukocyte count remains high for two or three weeks and then gradually falls to normal. With the fall in the number of white cells there is a transposition of lymphocytes, i.e., there is a gradual decrease of large abnormal lymphocytes and an increase in small lymphocytes. This lymphocytic displacement continues until the normal is reached, 35-40 per cent. of small lymphocytes, 4 to 5 weeks from the onset of the disease. The white count may, however, be within normal limits before the abnormal lymphocytes disappear, thus producing a relative neutropenia. The platelets and red blood corpuscles do not show any change; the absence of anemia is a great aid in the differential diagnosis because a mild anemia is present in lymphatic leukemia from an early date.

Specific Laboratory Tests

Forssman began the work in 1911 which eventually ended in the test for infectious mononucleosis. He found that in the serum of patients with fever due to sensitivity to horse serum, i.e. serum sickness, there were certain bodies (later called Forssman bodies) which would agglutinate sheep's red corpuscles even when high dilutions of serum were used. Paul and Bunnell and, later, Van Ravenswaay, pointed out that serum from patients suffering from infectious mononucleosis would also agglutinate sheep's corpuscles. These investigators later found that if serum from a patient with serum sickness was treated with a suspension of ground guinea pig kidney it would no longer agglutinate sheep cells; that is, the Forssman bodies were adsorbed by the guinea pig kidney. This

was not the case in infectious mononucleosis; the substances responsible for agglutinating sheep cells in this condition are not Forssman bodies but have been called heterophile antibodies. A heterophile antibody may be defined as an antibody which will react not only to its own antigen but to other and not phylogenetically related agents. The origin of these antibodies is not yet known. According to Van Ravenswaay, heterophile antibodies are either (1) built by virus antigenic action or (2) representative of an increase in agglutinins normally present in the blood. In support of the latter is the fact that normal human serum will cause clumping of sheep cells in dilutions of 1:32 but not in higher dilutions. On the other hand, it is found that the antibodies of infectious mononucleosis are adsorbed by ox cells whereas the normal agglutinins are not. For diagnostic purposes the agglutination test must be positive in serum dilutions of more than 1:84.

The test is carried out both macroscopically and microscopically; the former method is that of Paul and Bunnell and the latter is described by Strauss. The technique is as follows:

(1) Paul-Bunnell method (modified):

(*a*) prepare a 2 per cent. solution of fresh washed sheep's corpuscles in normal saline.

(*b*) inactivate the patient's serum by incubating it at 56 degrees Centigrade for 20 minutes.

(*c*) make dilutions of the inactivated serum in saline from 1:1 to 1:1000.

(*d*) put .25 cc. of the dilutions each in a separate 75 x 12 mm. test tube and add to each .1 cc. of the 2 per cent. sheep cell solution.

(*e*) incubate for 1 hour at 38 degrees Centigrade.

(*f*) shake the tubes gently and read.

The degree of clumping is read as 1+, 2+, 3+ or 4+, depending upon the amount and solidity of the agglutinated cells and the highest dilution in which agglutination occurs. The test tubes may be left in a refrigerator for two or three hours before the results are read.

(2) Strauss method:

(*a*) inactivate the serum as above and make up the serum and sheep cell solutions.

(*b*) using a large glass plate marked off in squares, put 3 drops of each serum dilution in a separate square.

(*c*) add to each, 1 drop of 2 per cent. sheep cells and mix gently.

(*d*) rotate the plate slowly for 10 minutes and examine for agglutination under the microscope.

(1) *Paul-Bunnell method* (modified):

(2) *Strauss method:*

The results are designated as above. The test is positive 6 or 7 days after the clinical onset of the disease and the height of the titre is reached in about 7 more days. In one case at St. Michael's hospital, agglutination of sheep cells took place in dilutions of patient's serum up to and including 1:1000, eleven days after the onset of symptoms. The heterophile antibodies are demonstrable for several weeks or months after the disappearance of symptoms. Infectious mononucleosis and serum sickness are the only conditions in which this reaction is positive and these can be differentiated as noted above, by the kidney adsorption test.

Pathology

As the term glandular fever suggests, the lymph glands are enlarged generally, and in about half the cases there is splenomegally. A lymph gland removed for microscopic examination is strongly suggestive of subacute lymphadenitis. Few lymphoid follicles are recognizable and these are enlarged and ill-defined. The capillaries are engorged and the lymph sinusoids are compressed by the proliferation of lymphoid cells. Here and there throughout the section a few mitotic figures may be encountered. The entire gland is infiltrated by lightly stained cells with a corresponding reduction in the number of dark stained lymphocytes. Although this picture is suggestive, a diagnosis cannot be made from it alone.

Diagnosis

Diagnosis is made from clinical findings, blood cell counts and examination of stained blood films. The case present-

ing a complex symptomatology will be readily recognized with the aid of the Paul-Bunnell test.

Treatment

The treatment is purely symptomatic; hot or cold compresses to the enlarged glands, saline throat irrigations and liberal use of acetyl-salicylic acid will alleviate the symptoms. As Marshall states, it is necessary to "do nothing and your patient will get well."

Summary

(1) Infectious mononucleosis may be a benign mononuclear leukemia or an infectious disease of virus nature.

(2) Certain heterophile antibodies present in the condition make early diagnosis (after the sixth day) possible with the Paul-Bunnell reaction.

(3) The mononucleosis cell is a large abnormal lymphocyte with a polymorphic nucleus and not an immature or lymphoblastic cell.

(4) The symptoms are often complex and puzzling, but most cases show fatigue, fever, headache, sore throat, night sweating and lymphadenopathy.

(5) Tissue diagnosis is not conclusive.

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Pages from the Past

ON ADOPTING AN OPINION:

"Numberless examples might be brought to prove the necessity of examining and sifting to the bottom, as often as such investigation is in our power, opinions, however long established and however generally received; for many are said to be confirmed by universal experience, yet upon minute and accurate enquiry, this universal experience turns out to be no more than universal rumour, founded at first on careless observation, and afterwards, swelled by false and exaggerated facts. But before we adopt any opinion which is to have an immediate influence upon the practise of medicine, we ought not only to weigh and examine those facts which we receive from others, but we must also be exceedingly careful not to be led into error by those which we gather from our own observation. It is evident that the first may lead us into error, because they may be false; and unfortunately the second, without attention and sagacity, may also lead us in error, although they must be true."

Medical Sketches in Two Parts,
By John Moore, M.D., printed in 1794.

"The psychotic lives in a world of phantasy, unaffected so to speak, by those vicissitudes of reality which precipitate and exaggerate the symptoms of the neurotic. To the neurotic his environment is hard and real. Unlike the psychotic he can never maintain what has been called 'La belle indifference' in unpropitious circumstances."

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Can. Med. Assoc. Jour., October, 1939.

CHEST SIGNS IN DISEASE

By G. E. WODEHOUSE, '40

Any attempt at examination of the chest must of necessity be made in an orderly fashion. This article has as its object the presentation and interpretation of certain of the more important findings encountered in the diseased chest in following the routine of inspection, palpation, percussion and auscultation.

Inspection.

On inspection of the chest, disease may manifest itself by changes in:—

(a) The bony structures.

(b) The overlying musculature.

(c) The normal depressions—the intercostal spaces and the clavicular fossae.

(d) The size of the chest as a whole, as compared to the rest of the body, and of one side compared to the other.

(e) The type and degree of movement present on respiration, of the chest as a whole and again of one side compared to the other.

(f) The type of respiration.

Changes in the *bony structures,* the ribs and sternum, result mainly from disease of infancy and of development, for example, rickets may produce the true rachitic chest, the pigeon breast, or the Harrison's sulcus.

The *overlying musculature* may in disease of the lungs suffer a wasting and weakening as if in sympathy with the underlying diseased structures. This probably is a result of restricted movement of the part of the chest concerned, but may be also a local accentuation of the general bodily wasting which accompanies certain pulmonary diseases.

The *intercostal spaces and the clavicular fossae* reflect directly the degree to which the chest is filled by its contents; thus a general accentuation of these depressions would indicate small lungs. While a local accentuation in one area would indicate possible disease and contraction, or possibly a better expression would be lack of expansion, of that part of the lungs immediately underlying. Thus accentuated supra and infra clavicular fossae are frequently found accompanying apical pulmonary tuberculosis of the side affected.

On the other hand, a bulging of these spaces indicates an increase in the chest contents. Thus emphysema will produce a fullness or will even to some extent obliterate the clavicular fossae, and will produce a corresponding fullness of the interspaces, usually bi-lateral. A local fullness in the lower chest is more suggestive of fluid in the pleural cavity. While a generalized uni-lateral fullness might be produced by pneumothorax or massive effusion of the side concerned. In these generalized uni-lateral enlargements, it must, however, be remembered that the true state of affairs may be rather a decrease in the size of the opposite chest.

The *type and degree of movement* should be noted. The normal chest on deep inspiration enlarges mainly by increase in the anteroposterior diameter, and by descent of the diaphragm. But there is also some spreading of the ribs laterally, and also from above downward. At rest, the large emphysematous chest is in a position corresponding to some degree of inspiration in the normal. Hence to produce further expansion the accessory muscles of respiration are called into play, and the chest moves as a whole up and down, with very little real expansion, and little movement of the ribs in relation to one another.

Of more importance is the comparison of the movement on respiration of corresponding points on the two sides of the chest. Rarely can we say that

there is any increased movement of a part—though this might occasionally be postulated as a compensating factor. However, even in this eventuality, there would have to be an initiating lack or decrease in movement of some other section; and hence we may say as a rule that any discrepancy of movement will be due to decreased movement of one part, rather than to increased movement of the other.

The *causes of decreased movement* of a side of the chest correspond largely with those causes producing a small chest, and consist mainly of those listed below.

Acute Causes:

1. *Pleurisy.* The resulting pain causes splinting of the affected side, and hence an apparent smallness.

2. *Consolidation.* These two conditions are responsible for the decreased movement in lobar pneumonia.

3. *Post-Operative Collapse.* From obstruction of a bronchus by inhaled material, or by excessive secretions, with resulting atelectasis of the lung tissue supplied by the bronchus concerned.

Chronic Causes:

1. *Scoliosis.* This condition, consisting as it does of a lateral curvature of the spine, will in the thoracic vertabrae produce a fanning of the ribs on the convex side, with a resulting large chest, and a corresponding small chest on the opposite or concave side.

2. *Paralysis.* For example, hemiplegia.

These two conditions are examples of changes in the chest without disease of the lungs.

3. *Fibrosis of the Lung.* This may be due to tuberculosis, bronchiectasis, bronchopneumonia, etc. There is a replacement of elastic lung tissue by inelastic fibrous tissue, with resulting contraction and loss of elasticity of the lung, and occasionally a shift of the mediastinum to the affected side, and a general limitation of movement of that side.

4. *Obstruction of a Bronchus.* By foreign body, mucus plug, blood clot, new growth, etc. Atelectasis results, leading to a small chest on the affected side.

5. *Thickened Pleura.* Resulting from a previous pleural effusion. The thickened pleura limits lung movement on the side affected.

A *large chest associated with decreased movement* may result from:

1. *Emphysema.* Either obstructive or non obstructive in type. The process is generally bi-lateral.
2. *Pleural effusion.*
3. *Pneumothorax.*

Associated with discrepancy in size of the two sides of the chest, we frequently have a shift of the mediastinum to one side or the other. The mechanism of this shift is not always clearly understood. In normal health, the mediastinum is a more or less midline structure, and has on either side the tension of the elastic lung tissue, which in turn is maintained by the much-disputed negative pressure in the pleural cavity. If now we decrease this negative pressure, or decrease the tension due to one lung, the resulting imbalance of the tension on the two sides will, if the mediastinum is not firmly fixed, result in a shift of the mediastinum towards the side of the greater tension. Thus in pneumothorax or pleural effusion we have initially a decrease in the negative interpleural pressure on that side, and consequently the mediastinum shifts to the opposite side as a result of the greater pull by the lung of that side. Conversely, if we have an atelectatic or fibrotic lung, of smaller volume, we have an increased interpleural negative pressure, with shift of the mediastinum to that side.

As the heart is a mediastinal structure, and as the normal position of the point of maximum intensity of its apex beat is known, the location of this P.M.I., frequently seen on inspection, gives us some idea of the position of the mediastinum.

Displacement of the P.M.I. may result from:

1. An enlarged or a small heart.
2. Pleural effusion, displacement being away from the side of the fluid. Usually the P.M.I. will not be visible in left-sided fluid.
3. Pneumothorax.
4. Fibrotic lung, shift will be to the affected side.
5. Atelectatic lung.
6. A raised left diaphragm.

Lastly, on inspection we should observe the *rate and rhythm* of the respirations, and the *type and extent* of respiration present. Depending on the extent to which the diaphragm is used, the breathing may be thoracic, abdomino-thoracic, or abdominal. The rate may be normal, elevated, or depressed. Defining dyspnoea as the consciousness of the necessity for increased ventilation, we see that it may manifest itself as an increase in the rate or depth of the respirations, and in the degree of effort necessary to carry out these respirations, as shown by the use of the accessory muscles of respiration, the sternocleido-mastoids, or the adoption of the orthopnoeic position, in which the weight of the abdominal vescera falls away from the diaphragm, thus allowing it freer and more extensive movement.

Disease may also manifest itself in the character of the individual respirations, for example the stertor of coma, the stridor of diphtheritic and croupous infections and the wheeze of the asthmatic. The length of the inspiratory and expiratory phases must be compared, and also the relative ease of the two. Any obstruction to the air passages will show itself first in prolongation of the expiratory phase, and in its more extreme cases, in marked difficulty in expiration, as this is the less powerful of the two phases. This is seen clearly in asthmatics.

Palpation.

Palpation should primarily check those findings observed on inspection; the form and movement of the chest and any visible abnormalities. The position of the P.M.I. of the apex beat should be more accurately determined, and the position of the trachea in the manubral notch, whether medially placed or deviated to one side or the other, as these points offer a check on the position of the mediastinum.

At this time, also, the phenomenon of **vocal fremitus** should be investigated, and a comparison made between the two sides. Fremitus has its origin in the vibrations of the vocal cords of the larynx, and the vibrations there produced are transmitted down the patent tubes of the bronchial tree and out through the lung tissue to the chest wall and thus to the palpating hand. Its intensity depands on three factors:

1. *The pitch of the voice.* The lower the frequency of the vibrations, the more easily palpable are they to the hand. Thus vocal fremitus is more easily determined in people with low pitched voices, and thus in males than in females. Similarly, it is less distinct in children.

2. *The patency of the bronchial tubes.* It has been postulated that the vibrations are transmitted from the cords to the lung parenchyma via the actual bronchial walls rather than by the encased column of air. Whatever the truth, obstruction of the bronchus for any reason prevents the transmission of vibrations by that bronchus, with resulting decreased fremitus over the area supplied by that bronchus.

3. *The state of the conducting media between the bronchi and the hand,* that is, of the lung parenchyma, the pleura, the contents of the pleural space, and the chest wall.

Vocal fremitus is increased in:

1. Consolidation of the lung parenchyma, as a solid medium is a more efficient conductor than the normal vesicular lung tisue.
2. A low pitched speaking voice.
3. Approximation of the bronchi to the chest wall. Thus vocal fremitus is

generally more marked over the upper right chest than over the left, due to approach in this area of the bronchi to the surface.

Vocal fremitus is decreased by:

1. Fluid in the pleural cavity. As the vibrations decrease in intensity with each transmission from one medium to another, the insertion of this extra medium into the conducting system effectually dampens the fremitus.

2. Pneumothorax.

3. Thickened pleura, following a pleural effusion.

4. Thickened chest wall—either muscular or adipose tissue.

5. Obstruction of a bronchus.

Percussion.

Percussion is a method of physical examination of which the results depend to a great extent on the experience and aptitude of the examiner. Thus it is useless to lay down hard and fast rules as to the method of percussion. It has as its purpose two main objects:

1. The outlining of the organs and masses, i.e., the heart, the dome of the diaphragm, the lung margins, areas of consolidation, etc.

2. The determination of the nature of the structure set in vibration.

For the first, two methods have been suggested and recommended, both using *very light percussion*. Heavy percussion is never advised for this purpose, as it occasionally leads to confusion due to the vibrations set up in deeper and adjacent organs.

(a) *Threshold percussion*. The use of the lightest stroke which will produce audible sound. The sound will disappear at the border of the organ being outlined, and thus the border is that line along which the change *sound to silence* is observed. This method is particularly adapted to the outlining of the lung borders.

(b) Use of a *very light stroke*. At the border of the organ, an abrupt change is noted, chiefly in intensity, and thus the outline is that line along which there occurs an *abrupt change in audibility*. This method is particularly adopted to the outlining of the deeper organs—the heart, the dome of the diaphragm, and deeper consolidations.

To determine the nature of the structure set in vibration, light or medium percussion is recommended, with the very occasional use of heavy percussion. The notes produced on percussion may be analyzed and differentiated according to four differences—two of major importance, and two of minor.

Major differences:

1. Changes in intensity or audibility of the sounds, these changes depending on the amplitude of the vibrations.

2. Changes in the quality or timbre, dependent on the presence of overtones and minor characteristics. The recognition of these changes depends largely on association, and is of the same quality which enables us to recognize again, once having heard a particular type of musical instrument, notes produced by that instrument.

Minor differences:

1. Pitch—depending on the frequency of the vibrations.

2. Duration.

These latter are of comparative unimportance to the major differentiations. On applying this analysis to the note produced on percussion, we may differentiate several types of response.

1. *Tympany*. This is the note produced by the vibrations in a hollow air containing organ, whose sides are under some degree of tension. Such is the note of percussed bowel, or stomach, or of the chest of pneumothorax, or occasionally of the superficially situated lung cavity. It is perhaps the loudest of the notes produced, and has the highest pitch.

2. *Skodaic resonance* is produced on percussion of an area of semi-relaxed lung tissue, as is commonly found immediately above the level of a pleural effusion, or above an area of consoli-

dation. It is due to the relaxation of the lung septa, with the resulting disappearance of their normal overtones and change from true resonance to a note resembling tympany.

3. *Hyperresonance.* This is mainly an increase in intensity of the percussion note, and is due to expansion of the lung tissue, with resultant increase in size of the vibrating body, and an increase in the tension of the alveolar septa. It is produced in emphysematous lung tissue, or in lung which has expanded in compensation to decrease in size of an adjacent portion—as in lobectomy or atelectasis of one lobe.

4. *Normal Lung Resonance.* This may best be described as that note produced on percussion of the normal healthy chest, and must be recognized by experience. Its peculiar quality is a resultant of the major vibrations of the lung and chest as a whole, with superimposed overtones of all the individually vibrating alveolar septa, and of the bronchi.

5. *Decreased or impaired lung resonance* is as it implies, a decrease in the intensity of the note.

6. *Dullness*—is defined as that sound which is produced when a structure having very little resonance is percussed.

7. *Flatness*—where there is no resonance.

Decrease in lung resonance may result from:

(a) Change in the lung parenchyma, which may vary from slight exudation to patchy or complete consolidation. Depending on the extent and location of this process, whether deep or superficial, the degree of impairment will vary from slight to absolute dullness.

(b) Changes in the overlying structures, for example:

(i) Thickened pleura—will decrease lung resonance.

(ii) Thickened chest wall—will decrease lung resonance.

(iii) Pleural effusion, depending on the extent, will produce varying degrees from impairment to absolute flatness.

These varying degrees of impairment may also be distinguished after experience by the feel and sense of resistance to the percussing fingers.

Other characteristic responses to percussion are seen in the "coin sound" of the pneumothorax, the "cracked pot" sound of the large cavity communicating with a bronchus, or the amphoric resonance of a cavity, with its prolonged note. All these are, however, only occasional findings and not by any means constant. For general purposes, the classification given above will prove adequate.

Auscultation

With reference to the respiratory organs, on auscultation of the chest we note particularly:

1. The breath sounds.
2. The adventitious sounds.
3. The vocal resonance.

The **quality** of the **breath sounds** may be:—

1. *Vesicular.* This type of breathing has a rustling character, and its audible inspiratory phase is normally longer than that of expiration. On expiration, the rustling character is also lessened. The sounds have been shown to be produced by the vibrations in the alveolar walls, as the tension in them varies.

2. *Bronchovesicular.*—This is a mixture of the alveolar or vesicular sounds, and the tubular or bronchial sounds, and is produced where the bronchi approach the chest wall, or where by reason of small consolidations, the sounds produced in the bronchi are carried to the surface with greater intensity, blending with the vesicular sounds of the surrounding alveoli. Expiration is somewhat prolonged, but not to the same extent as in true bronchial breathing.

3. *Bronchial or Tubular*—characterized by a blowing quality. Expiration is prolonged. These sounds are produced in the larynx, trachea and larger

bronchi, and are heard if the lung is consolidated, that is, whenever the breath sounds conveyed by the bronchi are transmitted unhindered and unchanged to the chest wall.

4. *Amphoric, or metallic.* These are of less importance, and are heard over large cavities and pneumothoraces. The sound has a musical, metallic, blowing quality, resembling that produced by blowing across the top of an empty bottle.

Breath sounds also vary in **intensity**, and may be:—

1. *Increased,* that is, abnormally loud. Such are puerile breath sounds, and those heard in the contralateral healthy lung of an uni-lateral pneumothorax.

2. *Normal Intensity.*—This is best learned by experience.

3. *Diminished,* that is, abnormally faint. This is important, and may occur if inflation of the lung is interfered with by such conditions as a partially plugged bronchus, thickened pleura, pleural fluid, partial consolidation, pleural pain, passive congestion, pneumothorax, etc.

4. *Absent.* Occurs if a bronchus is completely plugged, and over the lower part of a pleural effusion.

In the normal chest, vesicular breath sounds may be heard in the axilla and bronchovesicular usually over that part of the chest near the sternum, where there is heard a mixture of bronchial and vesicular breath sounds. True bronchial sounds are never heard in the healthy chest, but a very close approach are those sounds heard over the seventh cervical spine.

Apart from these types, we may have prolongation of the expiratory phase in particular in asthmatic or obstructive disease. This is a true lengthening of expiration, rather than of the audible portion of expiration. Or we may have a jerkiness of either phase, indicative of varying degrees of elasticity, and thus of disease, in the areas concerned.

Having noted the nature of the breath sounds, attention should be paid to the presence or absence of adventitious respiratory sounds, or râles.

Râles may be divided into:—

A. Rhonchi or Dry Râles are continuous sounds produced in bronchi of any size. They have a musical quality, and have been called piping or whistling râles. They are produced by air passing through a constricted portion of the bronchus, the constriction being due to congested mucosa, accumulations of mucus, new growth, foreign bodies, or pressure from without the bronchus. They may be subdivided into:—

1. *Sibilant*—or high pitched rhonchi—produced in the smaller bronchi.

2. *Sonorous* or low pitched rhonchi—produced in larger bronchi.

B. Moist Râles are discontinuous sounds produced mainly in the smaller bronchi. They have been called crepitations, bubbling râles, mucous or moist râles, and crepitant râles, and are produced by the bubbling of air past collections of moisture in the bronchi and bronchioles. They may be classified according to their size and to the presence or absence of a consonating quality.

1. *Size.*—Bubbles of different sizes have on bursting a peculiar quality or timbre which on recognition by association enables us to differentiate them into *fine, medium and coarse.* The type of bubble heard depends for its production on the size of the bronchus in which it is produced, and thus by classifying the râle heard according to size, we may by inference deduce its site of production.

As an aid to this classification, it may be noted that fine râles are usually less intense than are coarse râles.

2. *Consonating or crackling quality.* When râles are produced in a partially consolidated portion of the lung, they are higher pitched, and more distinct, and are called consonating or crackling râles. While râles in the presence of pneumothoraces or large cavities have

an added metallic quality, imparting to them the characteristic known as *tinkling*.

These qualities may be used to further qualify any size of râle, fine, medium or coarse, for the purpose of description.

Many râles may be heard on ordinary respiration, or on slightly deepened respiration. And as the inspiratory phase is the stronger, so the râles are more likely to be heard on this phase than on expiration. If the patient has been lying for some time in one position, some râles may be heard on examination which will disappear on coughing; while many others may not be elicited except after coughing, these constituting our *post-tussive rales*. Only those râles persistent after coughing are of importance; and no patient may be declared free of râles who has not been examined after coughing.

The presence of most râles in the chest is indicative of pulmonary congestion which may be inflammatory or circulatory in nature. Thus the crackling râles of pneumonia are inflammatory while those of cardiac insufficiency are circulatory in origin.

Vocal resonance offers yet another check on the condition of the chest contents. For this, either the whispered or the spoken voice may be used, but more information may be obtained from investigation of the whispered voice, and it has been found to be preferable. On auscultation, we may have:—

1. *Normal vocal resonance*. The voice is heard as an indistinct muffled noise. Change in tone may be recognized, but the individual spoken words are not distinct.

2. *Increased vocal resonance* accompanies bronchovesicular breathing. The voice is louder and more distinct.

3. *Bronchophony or Pectoriloguy* are homologous with bronchial breath sounds and are heard over consolidated lung. The voice is heard loudly and distinctly, and is not muffled. Whispered Pectoriloguy is often heard when it is still difficult to detect outspoken bronchial breath sounds.

4. *Aegophony* is of lesser importance. It is the bleating voice sound heard in the compressed portion of lung adjacent to a pleural effusion.

5. *Decreased or muffled voice sounds* —are heard under the same conditions as diminished breath sounds.

Two other sounds, referable to the pleural cavity, may occasionally be elicited; the friction rub of pleurisy, and the splashing, or Hippocratic succussion of the hydropneumothorax. The friction rub is coincident with respiration, is generally biphasic, at corresponding points in the two phases, and is increased by pressure over the neighbouring chest wall.

Hippocratic succussion is the splashing heard on shaking the patient, when he has both air and fluid in his pleural cavity — that is, when he has a fluid level in his chest.

The author's sincere thanks are due to Dr. W. P. Warner, for his outline and classification of the findings on percussion and auscultation, and for his criticism of the article as a whole.

THE PROTEIN REQUIREMENT OF MAN

By J. P. HARSHMAN, B.A., '43

Of the three major foodstuffs, carbohydrates, fats and proteins, it is well known that the latter substances form an important part of the tissues of the body, and are concerned in the formation of many enzymes, hormones, antibodies and related substances. The fact that proteins have such vital functions in animal and, more particularly, human metabolism, has provided ample excuse for the amount of work done on the protein requirement of man. The purpose of this review is to survey some of the results, obtained by workers in the field, and to attempt to give some conclusions on the amount of dietary protein needed to maintain optimum health under the conditions of ordinary maintenance, growth, pregnancy and lactation.

The proteins of the body are continuously undergoing destruction. This degradation of the nitrogenous constituents of the body is the "endogenous catabolism" and in an individual receiving a non-nitrogenous, but otherwise adequate diet, it is represented by the total urinary nitrogen.

It should be stated at the outset that there is no general and universal agreement as to the protein requirement of man. However, all investigators in this field agree that the loss of endogenous nitrogen must be replaced by dietary nitrogen in the form of protein, in order that nitrogen equilibrium may be maintained.

During the past few years, two rather conflicting points of view have developed with respect to the problem of protein requirement. On the one hand, there are those who hold that once sufficient dietary nitrogen has been absorbed to replace the endogenous losses, the nitrogen requirement of the body is satisfied. Such an amount of dietary nitrogen is obviously the minimum amount necessary to maintain nitrogen equilibrium. Furthermore, it is suggested by the exponents of this viewpoint that not only is additional nitrogen unnecessary, but, indeed, it may be undesirable. They conclude that "Whenever proteins are present in the diet in quantities exceeding those which are necessary to meet the specific nitrogenous needs of the body, and are used as energy-bearing foods, this is a twofold—physiological and economic—malpractice." However, all investigators are not agreed that this minimum level of protein intake can be regarded as the optimum value and maintain that not only must endogenous losses of nitrogen be replaced but additional dietary protein must be provided, in order that the body may function with optimum efficiency.

Let us examine, briefly, these two points of view. The excretion of endogenous nitrogen, by a 70 Kg. man, amounts approximately to 3 g. per day. This would mean that 18.75 g. of endogenous protein are catabolized daily. Assuming an average biological value of 50 for dietary protein, and a coefficient of utilization of 90 per cent, nitrogen equilibrium would be maintained on a daily intake of about 42 g. of protein.

Lietch and Duckworth have recently made a statistical survey of data obtained by themselves and by other workers. They have concluded that a protein intake of 48 to 52 g. per day suffices for equilibrium over a long period of time in the case of men and women having an average weight of 60 Kg.

It may be tentatively concluded that daily intakes of about 50 g. protein daily, in the case of a 60 Kg. person should be an adequate amount to sustain nitrogen equilibrium on a maintenance level.

Obviously any requirements of the body additional to those of maintenance, will necessitate an increased protein consumption. Such conditions are present during growth, pregnancy and lactation.

Growth.

Two workers suggest 4 g. of protein daily, per Kg. body weight, up to the age of one year. The requirement diminishes gradually until the time of cessation of growth which usually occurs shortly after adolescence. Furthermore, they concluded that protein in an amount equivalent to 15 per cent. of the caloric intake appeared to be adequate. Leitch reports a study in which 4 g. of protein daily, per Kg. body weight, provided optimal retention up till the age of three years.

On the other hand, it has been calculated that the maximum daily increment of body protein in the young, growing child is not more than .4 g.—an amount which should be adequately supplied by a daily intake of 1 g. of protein. This figure is much lower than the estimate of 4 g. per day, per Kg. body weight.

It is clear, therefore, that an exact estimate of daily protein requirement of the young growing child is not yet possible. If excess protein is not harmful, then it may be concluded that a daily intake of 4 g. per Kg. body weight is ample for children up to 3 years of age—after which the requirements gradually diminish to the adult level.

Pregnancy and Lactation.

During pregnancy, dietary protein has a two-fold purpose—that of providing for maternal maintenance and for growth of the foetus. Garry and Stiven state that the requirement for growth of the foetus is not great, particularly in the early months of pregnancy. They suggest 70 to 100 g. as sufficient total requirement.

Lactation, on the other hand, requires a greater amount of protein. The percentage of protein in milk is 2.01 per cent. This means 20 g. protein per litre of milk. From observations on a limited number of women, the largest yield of milk is obtained when there is added to the basal protein requirement an amount of protein nitrogen equivalent to twice the nitrogen content of the secreted milk.

Dietary Quality and Role of Amino Acids.

Proteins, alone, may be considered as having high, intermediate or low biological value, according to their digestibility and their content of amino acids. However, on combination with other proteins in the diet, the deficiencies of one will be compensated for by the amino acids in other proteins. It appears to be the consensus of opinion that in the average mixed diet all the 10 essential amino acids will be supplied.

As to the relative value of animal and plant proteins, the difference is negligible. It is generally agreed that the proteins of milk and eggs possess nutritive value higher than that of all other proteins. While it is probably true that many plant proteins are just as effective as many animal proteins, the fact remains that an adequate intake of plant protein necessitates a much greater ingestion of food than is the case when the protein requirement is provided by animal sources. There would seem, therefore, no reason to depart from the normal recommendation, that of the total protein ingested, 35 to 50 per cent. should be of animal origin.

The author wishes to express his sincere appreciation to Dr. A. M. Wynne for his valuable assistance in the preparation of this paper.

Abstracts

CRAWFORD B. SHIER, Editor

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CARCINOMA OF CERVIX TREATED BY ROENTGEN RAY AND RADIUM

JOE VINCENT MEIGS, M.D., F.A.C.S.
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Material from Pondville Hospital.

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In a paper of similar title in the 1937 Annals of Surgery, 70 cases of carcinoma of the cervix treated at the Pondville Hospital were presented which had been followed up for 3½ years. Now they have been traced for 5 years or more with the charts up to date. During the study other interesting facts were found regarding microscopic appearance of the radiation reaction and the importance of the genito-urinary tract complications which will be discussed more fully in papers at some future date.

Treatment:

X-ray treatments are given through four pelvic portals, 8x10 or 10x10 centimeters; 2 anterior and 2 posterior. Rays are directed obliquely at the cervix and parametrium by means of a centering device. Each field receives a total of 1500 or 2000 v units (air measurement) total dose depending on the rapidity with which the treatment is given. Daily exposures of 300-400 v, alternating the fields, so that a given area receives one exposure every fourth day. Machine setting is 200 kilovolt peak; 5-20 milliamperes, depending on the capacity of the apparatus; ½ millimeter copper and 1 millimeter aluminum filter; 50 centimeters of focal skin distance. This lasts 18 days.

Then radium treatment is given by means of the small emanation needle placed in a platinum applicator of 1 mm. thickness. This is inserted in the cervix for a total dose of 1500 millicurie hours, treatment lasting 5 hours. Repeat 4 days later.

Very little systemic reaction, practically no bladder or rectal irritation and no slough in the vagina occurs with this method of treatment. It is thus preferable to the former gold seed method placed in the periphery of the cervix and a silver cylinder in the canal. The patients are more comfortable with this slower type of treatment and convalescence is easier. It is a better treatment than radium alone. The weakness in the method of treatment lies in the radium plan, in that masses on the vaginal walls are not given sufficient treatment. They are now trying to remedy this by giving interstitial radiation in the vaginal wall extensions in the form of platinum needles 2-10 mgm. in strength with 0.5 mm. platinum filters, but not adding over 1000 millicurie hours to the total radiation treatment.

Material

The material includes early and late cases and all types of them. If the patient was too feeble to take the series then she was not included in the series. So it is a relative rather than an absolute group, but not a selected one. There were but 8 cases in the operable groups, the so-called A and B of the American College of Surgeons against 62 in the advanced C and D groups.

Repetition of treatment

This occurred any time after 3 months from the original radiation if recurrence of the disease was suspected. Many had broad ligament thickening and for this reason were given more treatment. From now on no more treatments will be given without positive evidence of carcinoma. In the retreated cases 10

lived and 27 died. They believe that the 10 who lived had no disease at the time of retreatment.

Type	*No. of cases*	*Cures*	*% cure*
A cervix	5	3½ years 5	100
		5 years 5	100
B cervix	3	3½ years 3	100
B vagina		5 years 2	66.6
C cervix		3½ years 16	35.5
C vagina	45		
C broad ligament		5 years 16	35.5
D complete fixation of pelvis and remote metatases and operably hopeless	17	3½ years 1	5.8
		5 years 1	5.8

Total salvage is 24 out of 70 cases of 34.4%.

Comparisons with other Clinics

Treatments by Lcassagne of the Institut du Radium Paris, and by Hurdon of Marie Curie Hospital, London, give better results, namely 46.8% total, and 41.2% total respectively. They are better able to distribute their radiation in the pelvis and about the cervix than those in the Pondville Hospital with their present plan of treatment.

Charts

The authors have charts drawn up for use as prognostic indicators which are similar to those charts of the previous article of 3½ year cures; it is thus not necessary to follow cases for more than 3 years, and then after deducting 15%, the five year end results can be predicted.

Both methods of radiation give better results than surgery:

Here are 5 year results in early cases:
Pondville (X-ray and Radium) . 87.5%
Mass. General Hospital (Radium) 64.3%
Mass. General Hospital (Surgery) 46.1%

Pathology

Biopsies are taken before and after treatment starts and at the conclusion of the x-ray therapy; one biopsy again at the time of second radiation, one before discharge from hospital; a total of 4 biopsies. If unchanged cancer tissue is seen then the prognosis is poor. Radiation reaction should be seen. However, this reaction, which is characterized by vaculization of cells, prominence of cell membrane, pyknosis of nuclei, abnormal mitotic figures, abnormal nuclei, fibrosis, change in blood vessel walls, change in connective tissue stroma, is not 100% accurate because it was seen in slides before treatment had been given.

Of 10 patients showing no radiation reaction after x-ray treatment, only 1 patient is now living.

Of 5 patients showing no radiation reaction after x-ray and radium treatments, none are living.

Metastases

These may occur along perineal lymphatics. Metastases in the sacrum, pelvis, ilium, ischium and pubis were numerous in this group.

Further comments

Presence or absence of proper microscopical radiation reaction is an important prognostic sign.

Kidney lesions due to blocked ureters with subsequent uremia are among the chief causes of death. More urological investigation should be done before, during and following treatment. They should be treated early rather than late.

C. B. S.

RESPIRATORY DEFENSE MECHANISM: ITS RELATIONSHIP TO PULMONARY DISEASES

I. L. APPLEBAUM

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There are three sites for checking aspiration of material into the lungs (respiratory defense mechanism):—the pharynx, the larynx (the most important of all, called the watchdog of the lungs) and the tracheo-bronchial tree. The reflexes at these points are depressed by alcohol, excess sedation (both of which have been employed in treating upper respiratory infections), also anaesthetics, comatose conditions (as diabetes), and in some people it seems to be more or less a natural depression.

Over 50% of patients with lung abscesses had depressed reflexes at these points.

The author believes that depression of

this mechanism is an important etiological factor in the development of lung abscesses and perhaps in such conditions as pneumonia, broncho-pneumonia, suppurative pneumonitis and other conditions.

An important trial in the etiology of lung abscesses is alcohol, a naturally depressed respiratory defense mechanism, and pyorrhea.

P. T. G.

NORMAL BLOOD PRESSURE

S. C. ROBINSON; M. BRUCER.
Archives Internal Medicine 64: 109
Sept. 1939

One fifth of the American population develops hypertension; heart disease causes more deaths in that country than any other two causes, and hypertensive heart disease is more common than all other forms put together. The usual termination of hypertension is cardiac defeat. Therefore measurement of blood pressure is very important prognostically, as it indicates early hypertensives. It is important therefore to know what the normal blood pressure is.

The authors discuss the methods by which so-called normal blood pressure figures were deduced, and indicate the fallacies of these methods.

From a new statistical study which was undertaken they conclude:—normal systolic pressure is 90-120 mm. Hg., diastolic 60-80. A normal person attains his mature blood pressure at adolescence and maintains it throughout life, except for a slight rise at about 20. Normal blood pressure does not rise with age. They conclude that there is no such entity or disease as "hypotension". Symptoms commonly ascribed to "hypotension" occur with equal statistical accuracy at any level of blood pressure. A person who has a history of pressures which occasionally dip to 90 systolic and 60 diastolic level has an added assurance of not being hypertensive.

Blood pressure higher than 120/80 for a 10-year span is pathologic and an almost infallible sign of incipient hypertension. P. T. G.

THE MIKULICZ OPERATION—DEVELOPMENT AND TECHNIQUE SURGERY, GYNAECOLOGY AND OBSTETRICS

Surgery, Gynaecology & Obstetrics
September, 1939.
R. W. McNealy, M.D., F.A.C.S., and Manuel Lichtenstein, M.D., F.A.C.S.

The Mikulicz operation consists of 3 distinct parts; *first*, the exteriorization of the loop of the diseased bowel; *second*, the formation of a double barreled colostomy; and *third*, the elimination of the spur with re-establishment of continuity of the bowel.

All the principles involved in the Mikulicz operation were well established half a century before the era of antiseptic surgery, and another 25 years passed before this ensemble of principles was made use of in the further development of surgery of the large intestine. Some of the men noted in this field were, Dorsey, Dupuytren, Billroth, Schede, Gussenbower, Czerny, Bryant and Hen-

icke. From 1884 the desirability of dividing the resection of the colon into three stages became more noticed and pronounced. Block and Paul pointed the way until in 1903 Mikulicz demonstrated the operation in the U.S.A. While there are several methods of resection, a safe concise method pointing out the details to avoid, the dangers incident to the technical features of the operation, is described in this article.

The drawings and clarity of the description of the various stages of the operation make this article invaluable to all medical students.

A. M. C.

THE CLINICAL MANIFESTATIONS OF THE VARIOUS TYPES OF RIGHT SIDED HEART FAILURE

By J. C. BRILL, M.D.
Ann. of Int. Med., Sept., 1939

Although the correlation of both sides of the heart are necessary for an efficient circulation, in failure one side may be affected to a much greater extent than

the other. To recognize which side is affected is important in determining the underlying pathology and the theraphy. Right ventricular failure or cor pulmonale has so far received little attention. In the majority of cases it is caused by increased pressure in the pulmonary circuit. Symptoms and signs may be divided into:—

(A) those of the underlying pulmonary disease such as (1) cyanosis, (2) dyspnea, (3) polycythemia, (4) hemoptysis, (5) clubbing of the fingers and toes, (6) specific signs of disease such as emphysema, pulmonary fibrosis, etc.

(B) those arising from strain and failure of the right heart:

(1) Increased venous pressure:—
   (*a*) Engorgement of superficial veins.
   (*b*) Subcutaneous edema.
   (*c*) Visceral engorgement with palpable tender liver.
   (*d*) Transudation into serous cavities.
   (*e*) Oliguria, albumin, blood, passive congestion of kidneys.
(2) Hypertrophy and dilatation of right heart as shown by x-ray and percussion.
(3) Accentuated pulmonic 2nd sound and murmurs and thrills in 2nd, 3rd left interspaces, gallop rhythym.
(4) Low systemic pressure.

The electrocardiogram may show left axis deviation.

Primary cor pulmonale differs from secondary variety in that the failure of the right ventricle is not preceded by failure of the left one. The secondary type occurs five times as often as the primary.

Primary cor pulmonale is divided into:—

(1) Acute type—caused by the sudden obstruction of pulmonary artery or a large branch. The symptoms have an explosive onset.
(2) Subacute—no history of antecedent cardio-pulmonary disease—rapid onset—caused by the metastatic invasion of arterioles by tumour.
(3) Chronic cor pulmonale—there is an underlying pulmonary condition. Onset is slow.

Secondary cor pulmonale is caused by the failure of the left ventricle which causes an increased pulmonary pressure. Failure of the right ventricle results from this increase. The three commonest causes of secondary cor pulmonale are:—

(1) Hypertensive disease.
(2) Deformities of the aortic valve.
(3) Coronary artery disease.

R. L. M.

PEPTIC ULCER PERFORATING INTO THE PANCREAS

J. SHELTON HORSLEY, M.D., *Richmond, Va.*
Annals of Surgery, Oct. 1939.

There seems to be some danger of extensive pancreatitis as a result of an ulcer that has perforated into the pancreas. With the base of the ulcer consisting of pancreatic tissue, if operation for removal of the ulcer is delayed too long, it may well be that the residual pancreatitis will not clear up promptly.

A Billroth I type of operation has successfully been used in 18 cases, of which 15 were successful in relieving symptoms, 2 were improved and 1 recurred. There were no deaths in this group. In 2 other cases it was not possible to do this type of operation and in one of these there was a post-operative death.

The Billroth I operation consists of a partial gastric resection including that portion of the stomach or duodenum containing the ulcer and the removal by cautery of a thin slice of pancreas forming the base of the ulcer, avoiding if possible opening the ulcer. The stump of the duodenum and the stomach are anastomosed. The advantages of this procedure are:—that the ulcer is removed along with the superficially infected portion of the pancreas; the stomach empties physiologically into the duodenum, which is more resistant to the gastric juice than the jejunum; the region of trauma is limited to one field and if there is a recurrent ulcer a posterior gastro-enterostomy can readily be performed. A primary gastro-enterostomy, which leaves the ulcer in

situ, does not appear to be logical, though there may be circumstances in which it is the only operation indicated, as when the reaction around the ulcer is extensive.

The mortality rate is not too great. In the patients in which this type of operation has been performed there has been no operative death.

A simple method of making a gastrectomy to substitute for a nasal tube is described. A 18″ soft rubber catheter is introduced through a puncture wound on the anterior wall of the stomach near the greater curvature. This is done after the posterior row of sutures uniting the stomach to the duodenum is in place. The catheter is sutured to the gastric wall and the butt is drawn through a stab wound in the abdominal wall and gently pulled upon until the stomach is in contact with the parietal peritoneum. The catheter fits snugly and there is usually no leakage after the catheter has been removed.

Discussion: Dr. Roscoe R. Graham, Toronto. The method is criticized in that pancreatic fistulae, pancreatitis, recurrence of ulcer at the line of anastomosis, may and have occurred following the operation. It is suggested that after adequate pre-operative treatment "the duodenum can be pinched off from the ulcer base, which is left in situ on the pancreas and is exteriorized by closing the duodenum and then turning the closed ends into the ulcer base, where it is held by interrupted silk sutures."

G. R. W.

DIABETIC INFECTION AND GANGERINE

GORDON MURRAY, M.B., F.R.C.S. (Eng.)
Toronto General Hospital
C.M.A.J. Sept. 1939.

Due to the general use of insulin many diabetics live in good health longer and reach an age where they develop cardiovascular degenerative diseases such as coronary thrombosis, cerebral thrombosis, ulceration, infection and gangrene of the extremities. Those that had surgical lesions of the extremities usually had not restricted their diet, so that they had glycosuria and elevated blood sugar. Most of the serious lesions for which the patient was admitted to hospital followed such minor injuries as the rubbing of a corn, or cutting ingrown toenails. The average duration of the lesions before admission to hospital was 28 days. Many of these patients were admitted in a state of severe acidosis, some were in coma, from an exacerbation of the diabetes and probably from the effects of a virulent spreading infection.

The various lesions responsible for this break in tolerance are:—

1.—Carbuncle and furuncle.
2.—Cellulitis of toe, foot, leg or hand, tendon sheath infection and perforating ulcer.
3.—Dry gangrene of toe or foot.
4.—Gangrene and spreading cellulitis of toe, foot or leg.

Medical treatment in these cases was the giving of sufficient glucose and insulin to eliminate the acidosis and to bring the blood sugar to a normal level.

Surgical Treatment

Carbuncles and furuncles,—these were treated by cruciate incision, packing with iodoform gauze or keep flaps open and allowed to granulate. Packing was changed for 10 days. Appropriate x-ray therapy and in some cases Staphylococcus toxoid were of value.

Cellulitis.—This started in most cases as a minor infection around a corn. Not infrequently perforating ulcer into an underlying bursa, tendon sheath or joint occurred. Adequate incision and stitching of small rubber tubes into the incisions, followed by irrigation with Hygeol solution gave moderately successful results. Pressure suction boots caused a rapid spread of infection.

Gangrene.—There were only 4 cases of dry gangrene. One had an amputation of a toe, the other Gritti-Stokes or midthigh operations. All four left hospital with their wounds healed.

Gangrene and Cellulitis.—The primary lesions are the same as in the previous group but infection spreads more rapidly. Amputation was the treatment employed. In the desperate case a guillotine opera-

tion was done at the junction of the upper and middle third of the tibia followed 28 days later by a Gritti-Stokes amputation. Primary healing occurred readily. In the less serious cases a Gritti-Stokes amputation was the primary procedure.

Conclusion:

1. Infections in diabetics are more serious than in normal people. Adequate care and protection of the extremities is essential.
2. Minor infective lesions respond to conservative treatment.
3. Local amputation may cure a few cases of localized gangrene.
4. Radical amputation is required for fulminating infection and extensive gangrene.
5. Where the diabetes is well controlled, infection or gangrene requiring radical treatment rarely appears.

J. G. W.

THE PREOPERATIVE AND POST-OPERATIVE ADMINISTRATION OF VITAMIN K TO PATIENTS HAVING JAUNDICE

HUGH R. BUTT, M.D.
ALBERT M. SNELL, M.D.
ARNOLD E. OSTERBERG, PH.D.
Rochester, Minn.

J. A. M. A., July 29, 1939.

It has been demonstrated that bleeding in jaundiced patients is caused by a deficiency of prothrombin in the circulating blood, and that both this deficiency and the haemorrhagic state can be corrected by administering the fat soluble vitamin K, together with bile salts to insure absorption of the vitamin. These investigators have established standard methods of treatment of such patients. They discuss first,—

The Clinical problem of cholemic bleeding:

The cholemic bleeding accounts for 50 percent of the mortality accompanying surgical intervention on patients having jaundice. It is found that there is no alteration in the amounts of calcium, bilirubin, platelets or thromboplastin in cholemic bleeding. There is a lack of prothrombin. The fat-soluble vitamin K normally present in the diet is absorbed and utilized by the liver in some way to maintain a normal concentration of prothrombin in the blood plasma. For routine determinations the prothrombin coagulation time (Quick) is used to estimate the content of prothrombin in the blood.

Dosage and Methods of Administration of Vitamin K.

Oral administration:—200 mgm. to 8 gm. of crude concentrate are given each day for a week. 20 gm. per day for seven days has caused no untoward effect. Even if the prothrombin time is normal jaundiced patients are given prophylatic treatment for 2 to 5 days before operation. If the prothrombin time is longer than fifty seconds bile salts as well as vitamin K are given by duodenal tube. If the patients are actively bleeding it is well to give transfusions to provide a temporary supply of prothrombin. Parenteral administration is sometimes used instead of oral administration.

The absorption of Vitamin K from the digestive tract:

The influence of bile—In cases of obstructive jaundice with complete acholia no shortening of the prothrombin time occurs on administering vitamin K by mouth. Bile plus vitamin K when administered caused a rapid fall in prothrombin time.

The importance of a normal intestinal surface—K-avitaminosis has been observed in patients with abnormal or insufficient intestinal absorptive surface.

The role of the liver in the utilization of vitamin K

The liver is the site of prothrombin formation. Even a badly damaged liver, however, can synthesize prothrombin. Some severely damaged livers lose this power.

Results of vitamin K and bile salt therapy

In a large majority of patients bleeding has been controlled by this therapy. In some cases treatment was a failure, especially where the hepatic parenchyma

was damaged. It is to be noted that many cases of cholecystitis with gall stones and mild hepatitis also suffer from cholemic bleeding, even when obstruction is only partial.

The value of pre-operative therapy

The incidence of post-operative bleeding is sixteen times greater in these cases that received no pre-operative vitamin K and bile salts before surgical intervention.

Vitamin K does not affect the clotting time or the tendency to bleed in hemophilia, essential hematuria or metorrhagia.

J. G. W.

BOOK REVIEW

SURGERY OF THE HAND

By DR. J. H. COUCH, Dept. of Surgery, Toronto General Hospital. *U. of T. Press, 1939. 143 pages. $1.50.*

The student will value this manual on the diagnosis and treatment of injuries and infections of the hand. Many of us have in past years been advised to read more voluminous texts on diseases of the hand, but we now have a practical guide, written by one of our own instructors, which is within financial reach of every student.

The book falls into two sections, the first dealing with injuries and the second with infections. Each section is further subdivided into chapters with a short plan preceding each, and both are amply illustrated with large line drawings.

Students of the clinical years will remember a very instructive and interesting article on Infections in Hands by Dr. Couch, printed in the March issue of last year's Journal, which is a summary of part of the section on Infections in this new book.

An excerpt from the foreword by Professor Gallie is as follows:—

"Not only is this book a useful text for undergraduates, but it is a clear and authoritative guide for practitioners, which, if followed faithfully, will lead to a great reduction in the suffering and subsequent disability that results from injuries and infections in the hand."

K.C.G.

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Feature Section

S. L. LAWSON, Editor

THE MEDICAL STUDENT IN ENGLAND

By ANTHONY S. TILL, M.B., F.R.C.S.(Eng.)

Medical students are often apt to commiserate with themselves on the inordinate amount of work to which they are subjected during their early years and on the relentless frequency with which examinations disturb the even tenure of their lives. This is not peculiar to any country or university as medical education, as a general rule, is the same the world over. It was suggested, however, that an account of the curriculum of an English medical student might be of interest to those studying medicine in the University of Toronto.

Medical degrees are granted by seventeen universities in the British Isles, and by the Royal Colleges of Physicians and Surgeons in England, Scotland and Ireland and by the Society of Apothecaries in London. Of these, teaching facilities are afforded only by the Universities, the remainder being examining bodies only. Medical students in the majority of Universities receive their training and graduate in the same way as in Canadian Universities. The arrangements in London, Oxford and Cambridge are, however, somewhat different, as these two latter universities have no facilities for clinical teaching and undergraduates must complete their final years elsewhere, usually in London. The eleven large Medical Schools of the teaching hospitals of London are affiliated to that University. These hospitals are what are known as voluntary hospitals, supported only by their own endowments, and private subscriptions and enjoying, therefore, a considerable degree of autonomy. Most of these teaching hospitals are self-contained units with facilities for teaching the pre-medical as well as the strictly medical subjects, and each has its own professors in the various subjects who at the same time are recognized teachers of the University of London. The prospective medical student, having passed the requisite preliminary examinations or matriculation, enters whichever medical school he prefers. In London the medical student's own hospital is his Alma Mater and not the University of London, whose portals he hardly ever enters and for which he can have little affection or interest. He will receive all his training at this hospital alone, represent the medical school in sport and finally take the London degrees or the rather easier conjoint examination conducted by the Royal College of Physicians and the Royal College of Surgeons. Undergraduates of Oxford and Cambridge take only their clinical training in London and sit for their final examinations in their own Universities. It may be mentioned that the London teaching hospitals are still not reconciled to co-education and that only two will accept women students.

It is possible to become a qualified medical practitioner in five years, starting from scratch, but in the majority of university courses it is not possible to graduate under six years, the degree then conferred being the M.B. The M.D. in England is a post-graduate qualification obtained by relatively few on submission of a thesis, after a specified number of years have elapsed since graduation. The first two or three years of study are spent in the usual subjects, physics, biology and chemistry, anatomy, physiology and pharmacology. The final three years of clinical work vary somewhat in each of the hospitals but on the whole are fairly uniform. The following account will be of my own hospital — the Middlesex — with which I am most familiar.

The clinical period consists of a series of appointments to the various departments of the hospital. The first of these is for three months in the Casualty Out-Patient Department. This appointment is an extraordinarily useful one and is of no small satisfaction to the student since it is his first active contact with real patients. From 9.30 a.m. till 5 p.m., in relays with his colleagues, he spends a busy day, stitching up cuts, and putting on innumerable bandages, hot fomentations and Scott's dressings and seeing all the varied types of humanity and disease which walk into any Out-Patient Department. During their three months the students get a fair amount of minor surgery, such as excising sebaceous cysts, opening boils and doing circumcisions under the supervision of the Casualty Surgical Officer. There are seldom less than 100 patients seen daily and usually nearer 150. In addition to these surgical cases the dressers also attend the Casualty Medical Officers who treat large numbers of patients with minor medical complaints and refer cases to the other clinics of the hospital. The Casualty Department is a clearing house, but the great majority of the minor surgery is treated entirely by the Casualty Officer and only cases requiring further investigation or treatment are referred to the Visiting Surgical Staff at their clinics each afternoon. For two afternoons each week the new dressers attend these Out-Patient Clinics where the referred cases are examined and discussed.

The next six months are spent on Medical Wards, the students being responsible for 6-10 cases each, taking histories, doing routine examinations and making progress notes on each patient till discharged. This period is probably not one of the most strenuous, the Wards open at 10 o'clock to the Medical Ward clerks and the leisurely routine of the morning is punctuated by a round with the Registrar or a cup of coffee over which cases may be discussed. Two afternoons a week the physician makes a teaching round of all his patients, accompanied by the sister of the Ward, the house physician and the Medical Ward clerks, who for this august ceremony appear in their most professional-looking suits. Pathology lectures usually coincide with this appointment and the students attend each day in the post-mortem room and must be signed up for two autopsies that they, themselves, have done.

The next appointment is that of Surgical dresser, three months on each of two services or firms as they are called. Here the dressers write up the notes on the cases assigned to them, shave and prepare their patients and scrub up for their operations, subsequently doing the dressings for the male patients. The female patients are looked after by the nurses. For a keen dresser this is a fairly strenuous six months and in direct proportion to his efficiency and enthusiasm he will be entrusted with blood transfusions, grouping relatives, intravenous saline, some minor surgery. Having no male orderlies, either in the Ward or in the Operating Theatres, the students are of considerable help and despite a good deal of menial labour derive a creditable amount of practical experience from this work. Arrangements for surgical emergencies vary in the different hospitals, — at my own, each surgical firm admits emergencies for one week in each month and four surgical dressers live in the hospital during this week in order that they can see as much as possible and also help at night. Unfortunately the waiting list of ordinary non-acute cases is so long that it is difficult to keep many beds empty for emergencies which very often go to the London County Council Hospitals instead and are thus not available for teaching. The recently instituted "Emergency Bed Service," by establishing a central office with information regarding the number of vacant beds in each of the voluntary hospitals, is an attempt to unify their organization

and facilitate the busy general practitioner in getting acute cases into a voluntary hospital.

Following the surgical dressership, six months are devoted to Gynaecology, Obstetrics and diseases of children. Apart from Ward Rounds, and watching operations, the greater part of this is spent in the Out-Patient Department and ante-natal clinics. Owing to the increasing numbers of students and prospective midwives and the decline in the birthrate it is impossible for each student to deliver at his own hospital the 20 cases required by the examining bodies. As a result it is usual to spend a short period in the Maternity Department of one's own hospital and then go for a month to hospitals in more prolific neighbourhoods. Arrangements are made with other hospitals such as Queen Charlottes, the Rotunda Hospital in Dublin and other large institutions around London.

My own training in Dublin was an unforgetable experience. Bethel Solomons was then Master of the Rotunda and wearing check trousers and a large and floppy bow tie he made rounds with students and post-graduates from all over the world. After watching two normal deliveries in the Labour Ward one was then considered fully equipped to go out on "district." Working in pairs with drugs and instruments provided by ourselves we sallied forth into basement tenements and rooms sometimes housing two families and would conduct the entire case from a preliminary enema to washing and dressing the baby, with a glass of Irish whisky for the "Doctor" when all was done. Despite the septic technique employed—without masks or gowns and with gloves and swabs boiled up in a saucepan the cases did extraordinarily well and only two deaths occurred in over a 1,000 cases on the district that year.

Conditions in London are rather more organised than this but it is still the custom for students to gain part of their practical obstetrical training on the district.

On the completion of this last appointment there are a number of three-month periods in special subjects, some of them running concurrently. These are anaesthetics, orthopaedics, dermatology, E.N.T., neurology, ophthalmology, radiology, etc. The work is largely in Out-Patient Clinics, where the students may examine cases. Courses on communicable diseases, commonly known as fevers, and mental diseases are taken at L.C.C. Isolation hospitals and asylums.

It may seem surprising that no mention has been made of lectures but there are no systematic lectures in Medicine and Surgery. On the whole, during the clinical period, lectures are relatively few. Once a year courses in Pathology, Obstetrics and some of the special subjects are held, and twice a week clinical lectures usually on recent interesting Ward cases are given. Four times a year for one month preceding each final conjoint examination, reunion courses are held in each of the subjects. Incidentally the parts of the final conjoint examination may be taken separately and as many times as one wishes. At these times there is a noticeable increase in the popularity of the Museum and in the student attendance in the Out-Patients in a last minute thirst for knowledge.

On the whole the basis of the student's medical experience is based on Ward work, what he sees in the Out-Patients, what he reads and to a much lesser degree on the lectures he attends. Whether or not full advantage is taken of these opportunities is entirely up to the individual who may attend as much or as little of the hospital practice as he wishes. Owing to this, and to the fact that examinations may be failed as many times as one chooses to pay the entrance fee, a small residue of "chronics" is usually found in the Out-Patient Department or playing poker in the common room. These students may continue to attend

the hospital till such time as they are finally through their qualifying examinations. A famous case was that of a rather eccentric student who hung about the hospital intermittently and ineffectually for 10 years, claiming quite correctly that he had paid his fees to study in perpetuity or until he got through his examinations. He was only eventually ejected when he started writing offensive and libellous letters to members of the staff.

As regards the social life of the medical student, the 3 years clinical period is not divided into terms except with regard to lectures. The practical ward work and rounds go on all the year, each appointment succeeding the other so that holidays are taken whenever they can be conveniently arranged. Many of the teaching hospitals have recently built hostels to accommodate students doing clinical work on the hospital premises. In these, comfortable accommodation is provided at a reasonable price with the added advantages of a billiard room, squash court and sometimes a swimming bath.

The medical students in London hospitals have excellent facilities for sports. Every hospital has its own playing fields on the outskirts of London and runs several rugby, football, hockey and cricket teams. Inter-hospital sports, especially the rugger cup, are followed very keenly, in fact the acquisition of a good athlete is of greater importance to a Medical School than is a new professor! Scholarships are not always awarded for academic proficiency alone. Sailing is very popular, both with staff and students, and the Hospitals Sailing Club is a most flourishing concern. The staff generally take a great interest in the hospital matches and this as well as staff vs. student golf tournaments help very considerably in maintaining friendly personal relationships between the honorary staff and the students of the hospital.

An attempt has been made in this brief description to describe the training of a medical student in England, up to that happy day on which he graduates only to find that his medical education has just begun.

Pages from the Past

ON MEDICAL ETHICS:

"But a physician whose practise lies among the highest spheres of life, if it amounts to £3,000 yearly, is supposed, at a moderate computation to receive £2,500 of that sum for prescribing for imaginary complaints, or such as would have disappeared fully as soon as had they been left to themselves. But this ought not to be imputed as a crime to the physician; if an old lady cannot dine without comfort till he has felt her pulse, looked at her tongue, and told her whether her chicken should be roasted or boiled, it is reasonable he should be paid for his trouble."

Medical Sketches in Two Parts,

By John Moore, M.D., printed in 1794.

Medical Society Notes

By PAGE STATTEN, Secy.-Treas.

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President, Medical Athletic Assoc....J. A. Boyd
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Chairman, Daffydil Committee.....R. L. Stirrett

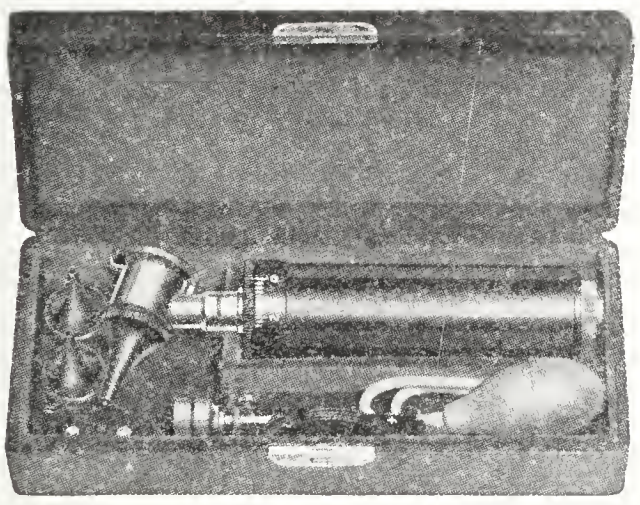
The Executive takes pleasure in welcoming as members of the Medical Society, the new freshman class. We feel that you have made a wise choice in your university and your faculty, and wish you every success in the long road before you. Also we would like to welcome as members of the Medical Society those students who have joined our faculty in the higher years in order to finish their medical course at Varsity; we hope you will feel at home right from the start.

For the benefit of the new members, the Medical Society is a student organization made up of all the members of the Faculty of Medicine. The Executive is elected in the spring term, and consists of representatives from each year. Weekly meetings are held by the Executive at which student problems are discussed. The Executive represents student opinion before members of the staff, and staff opinions are brought to the students by the Executive.

The freshmen will be officially welcomed to the faculty and to the Medical Society at the annual Soph-Frosh Banquet. This is being held, as usual, in the Great Hall at Hart House, on October the twenty-sixth.

At the present time preparations are being made for the Soph-Frosh Dance. This year Hart House has been made available for this gala event. Arrangements are being drawn up by the combined efforts of the first and second year executives. It is expected that this dance will not be confined to the first and second years alone, as in the past it has been well represented by each year. Being the first event of the social season for Meds, students feel that they can take a little time away from their studies for that much needed relaxation.

We hope that in these troubled times we will be able to cooperate with the Faculty to an even greater extent than before. We understand the important position held by medical students and we feel that the social activities carried on by the Medical Society have a real place in student life. These activities may be somewhat simplified to conform with present conditions, but we will carry on!



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Medical Athletics

By D. R. CLARK, Secy.-Treas.

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Third Year Rep.....Andrew M. Park
Second Year Rep.....James F. Murray
First Year Rep.....John Cole
Quartermaster.....A. J. Denne

Once more a new school term has rolled around and we have begun our studies, not under the shadow of another post-harvest crisis, but in the glare of a full fledged second world war. How this will change medical athletics time will tell. As yet all fall sports have had a good turnout despite large number of men diverting to the C.O.T.C. We feel that this is a very healthy sign as now as never before will healthy bodies and the team work learned in sports be placed at a premium.

The Intramural Athletic Directorate has approached the C.O.T.C. commanders and gained permission for interfaculty sportsmen to obtain leave from lectures and drills to compete in interfaculty games. The only requirements are that you inform your C.O. of your intended absence. We beg you not to take advantage of this measure unjustly as only by your full co-operation will its continuance be possible.

For the enlightenment of first year men we would like to describe the purpose and workings of their Medical Athletic Association. The Association is made up of six members representing the six years. The president is elected from sixth year, vice-president from fifth year and so on. Of these officers the three senior men are elected by the whole faculty at the annual elections whereas the three junior men are elected by their year alone. Each officer has a vote and exercises his prorogative at the weekly meetings held throughout the year. It is the duty of this body to organize medical athletics, appoint team managers, obtain coaches, and authorize the purchases of the appointed Quartermaster for equipment.

Each member of the faculty pays $1.50 toward the support of athletics so that each member should try to obtain full value by participation or full interest and co-operation.

An athletic "M" is awarded to men applying after fulfilling the following requirements:

1. A first "T" holder.
2. A member of an interfaculty championship team.
3. Three years' participation in an interfaculty sport.

At the present time we have two rugby teams in the field. The Senior team are the championship defenders. The Soccer team is defending its championship, and one lacrosse team and four volley ball teams are under way. We feel justly proud of this year's Track team which has already carried off the Freshmen meet and placed second in the Senior meet. Freshman Delaney deserves a "pat on the back" for his yeoman service in this field.

Despite the loss of Holden and Gray through graduation we still have two men on the Senior rugby team; namely, Murray and McNeil. Intercollegiate Soccer is carrying four medicos, Baird and Boyd being important factors in the present strong position enjoyed by the club.

In closing may I say that this year, too, must be a Medical one in athletics and only by united action can that end be achieved. It behooves me to say that Milton was not referring to interfaculty sports when he said, "They also serve who only stand and wait!"

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We invite you to examine these in our reading room.

C.A.M.S.I. Notes

By A. J. DENNE

Pre-convention conference held at Laval University, Quebec City September 23

In keeping with the Camsi policy, it was decided to hold a conference as the school year got under way to discuss the aims and accomplishments of Camsi in order that a reasonable and orderly agenda and a concrete report of accomplishments might be presented when the national Camsi convention is held at Queen's University in February. This was organized by the Camsi at Laval University and delegates from Laval, Montreal, McGill, Toronto and Western Universities met in Quebec city to this end.

Mr. Gerald LaSalle of Laval presided as chairman and welcomed the delegates, both French and English, and immediately called on the various representatives for reports on Camsi activities in their respective schools.

TORONTO

Mr. Lloyd Hisey of Toronto reported that the Toronto branch had done considerable work on the formation of a Canadian Intern Board to facilitate the appointment of Interns in Canadian hospitals which would approve the plan. That it would be of mutual value to the Hospitals as well as the Interns was pointed out. The financing of the plan was then discussed. For the present no definite financing is available and the problem was to be ironed out at Toronto. Mr. Hisey stated that it was not impossible that the plan could be put into effect to benefit the Interns and Hospitals this year, and advised that the present graduating classes apply to the various hospitals as usual and that if the plan does operate, notice will be given out and forms distributed by the Intern Board.

MONTREAL

A delegate from the University of Montreal reported that price reductions on books had been obtained. Tuberculosis amongst the students was investigated and preventive measures in the form of Tuberculin skin tests and X-ray examination for positive reactors carried out. A full report of this survey was made and sent to the Quebec commission for the investigation of Tuberculosis. No government action has resulted although the report is in the Provincial files for their information. It was stated, however, that the report was viewed favourably.

McGILL

McGill University's Medical undergraduate society reported that it had decided to officially affiliate itself with the Camsi and has changed its constitution to assure the closest cooperation to Camsi. The problem of Tuberculosis was attacked with a plan for skin tests and X-ray examination being put into effect. A desire to have Faculty and Student discussion as to Curriculum changes was proposed but had not met with favour at the Faculty office. It was suggested that Toronto be consulted, as a similar desire was fulfilled there after a student canvass and the results presented to the faculty for their consideration. A "Speakers' Bureau" is being set up where talks on the distribution of Medical care will be presented under Camsi auspices. An interesting change at McGill resulting from the new four-year course is one whereby the graduating students from this course will be obliged to intern in a Montreal or district hospital for one year before being allowed to practise. Perhaps the most important accomplishment at McGill was the result of the work done in a survey by the Intern Welfare Board which circularized interns in several hospitals and compiled a comprehensive report from their replies which may become of great importance to prospective interns regardless of the local system of interning under which they may operate. Since many hospitals have not been circularized the report is incomplete and an attempt is to be made by Toronto and Western representatives to increase the amount of data along this line. The information is to be forwarded to McGill as soon as possible.

WESTERN

University of Western Ontario reported that a cooperative book store had been set up which offers the medical students reductions of 10% on books; 20% on instruments and 10% on microscopes. The store is operated in the Medical buildings and the overhead is covered by general sales of a Tuck shop run in conjunction with the book store. The profits, if any, being returned to the students in the form of further price reductions on the above.

LAVAL

Laval reported that reductions had been obtained in their book prices. The student health board had obtained a compulsory physical examination for students entering Laval and an investigation of Tuberculosis amongst students was proposed. A new system of internship had been adopted and was now in practice whereby final year students were appointed as interns in hospitals associated with the University. This plan is also in effect at the University of Montreal.

In a general way as well as a business way, the conference was a distinct success. The delegates were royally entertained by our hosts at Laval University. The entertainment included a tour of Laval University and Laval Sanatorium at St. Foy, Que. Individual tours of interesting old Quebec city were made. Teas, luncheons and suppers also were much enjoyed and provided opportunities for informal discussion amongst various delegates on the many phases of student and intern activity.

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In Memoriam

HUBERT HAYWARD, B.A., M.D.

This page is dedicated to the memory of one of the grandest lads who ever passed through our medical halls. A scholar, an athlete and a true gentleman, he was the finest friend a man might hope to possess. When he graduated and set his sails for a surgical career, he always had a smile and an encouraging word for the student.

Hugh attended the Hamilton Central Collegiate Institute where he was awarded the Sir John Gibson and the Carter scholarships. In 1930 he enrolled in Biology and Medicine at Trinity College, heading the graduating year of that course. At the end of his fifth year he obtained his Junior Canadian Fellowship and in his sixth year was editor-in-chief of this Journal. In 1937 he obtained his M.D., winning the Burnside scholarship and the Chappel prize in Clinical Surgery. Following a year as rotating interne at the Hamilton General Hospital, he was accepted as a resident in Surgery at the Toronto General Hospital. He had completed the first year of the Gallie course in Pathology and Medicine and had just commenced his Surgical training proper when the protracted illness set in.

He is survived by his parents, a sister, Anne, and a brother, Douglas, all of Stoney Creek, Ontario.